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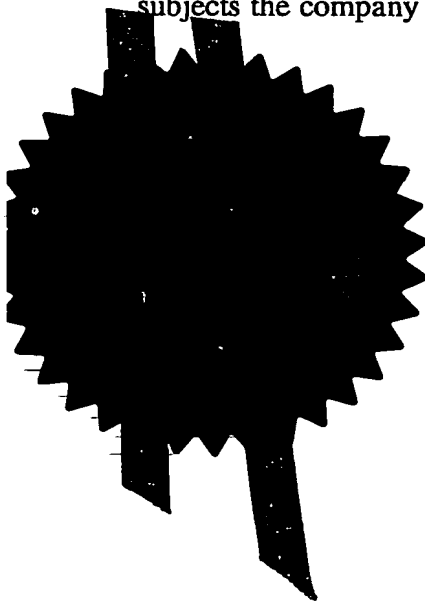
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Request for grant of a patent

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1.	Your reference	**A30400**

2.	Patent application number *(The Patent Office will fill in this part)*	**0322877.2**

3.	Full name, address and postcode of the or of each applicant *(underline all surnames)*	**BRITISH TELECOMMUNICATIONS public limited company** **81 NEWGATE STREET** **LONDON, EC1A 7AJ, England** **Registered in England: 1800000**
	Patents ADP number *(if you know it)*	**1867002** ✓
	If the applicant is a corporate body, give the country/state of its incorporation	**UNITED KINGDOM**
4.	Title of the invention	**SEARCH SYSTEM AND METHOD**

5.	Name of your agent *(if you have one)*	
	"Address for Service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*	**BT GROUP LEGAL** **INTELLECTUAL PROPERTY DEPARTMENT** **HOLBORN CENTRE** **120 HOLBORN** **LONDON, EC1N 2TE**
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		Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*
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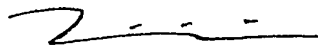   to grant of a patent *(Patents Form 7/77)*

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SEARCH SYSTEM AND METHOD

This invention relates to a search system and method of searching which allows data to be searched for and retrieved over a distributed computer system. The search system and method use a protocol which enables a user to be associated with a permanent identity which can be mapped to an address (which may be either static or dynamic). In particularly, but not exclusively, the search system and method uses a permanent identity such as a Session Initiation Protocol (SIP) User Resource Identifier (URI), to retrieve data from a distributed computer system to enable a search result to be sent to the user even if the initial search session has terminated. This invention is co-filed with the inventors patent application entitled "PURCHASING SCHEME", a copy of which is filed herewith the contents of which are hereby incorporated into this description by reference.

Search systems for retrieving data (i.e., information) from distributed computer systems such as the Internet are known to have certain limitations. Internet search sites, for example Google™, are configured to return results within a time limit which appears almost instantaneous to the user of the search site.

Consider the case where a person enters a highly complex search request on such a search site, for example, a search request involving perhaps a complex string of key words and Boolean operators. If the search request is sufficiently complex then conventional search sites would not be able to return any results complying with the search query criteria in the short period of time which is usually set for determining and displaying the search results.

A search entered on a conventional search site usually has to generate at least one search result within a specific period of time or the search site will display a negative search result to th4e user of the search engine. There is no mechanism to accommodate complex searches or to provide a search storage facility so that a user may in fact "log-off" the search site and retrieve their search results at a later point in time. The users of such search sites are effectively limited to the length of session that they can have with the search "server".

Other limitations include the user of a search site being unable to select where the search results are sent or how the search results are to be formatted and presented. For example, a user may enter a search request on a personal computer type terminal having a conventional display attached. However, the user may not want the results until a few hours have passed so that complex information can be retrieved and they may want the results to be displayed on their mobile phone.

Another limitation is that only restricted preferences are currently stored for users normally on the user's terminal or on the search "server". For example, preferences stored on the user's terminal can be provided by Internet Explorer 6 (IE6) predictive typing, stored lists past sites or content filters. Yahoo portal customisation is an example of the latter. However if one were to search for Manchester City and want information on the city itself and not the football club of the same name, it would be impossible to record a negative preference such as "AND NOT football" which would be retained for parsing future search results.

Another limitation is that current search methods do not support providing results in a variety of different formats. For example, current search methods do not enable a search engine to send an Email, phone a hotel and fill in a web form automatically. This is because search methods known in the art do not have the deeper understanding of the search preferences which would be required to implement such a sophisticated search method, as known search methods have no mechanism for understanding the context of the search, for example, – where the user is, the time, the preferences, etc, nor do current search methods offer a permanent state storage.

The present invention seeks to mitigate and/or obviate the above limitations known in the art by providing a search system and method which supports complex search queries being entered and which modifies searches according to user preferences. User preferences are also used to perform supplementary searches to obtain more detailed information and to designate end terminals where search results are to be sent.

Summary Statements of the Invention and Advantages

A first aspect of the invention seeks to provide a method according to claim 1. A search result could be forwarded by the proxy server to a data source by the proxy server sending an electronic mail message to an electronic mailing list associated with the search result, or by filling out a web page (e.g. for insurance quote) automatically. The data source may not be accessible via another server but could be accessible via instead an IP-PSTN gateway, for example, if the proxy server uses automatic speech generation and recognition technology to phone up a hotel and actually request a price using some conversion means to convert the text version of the search request into a spoken version.

The data source may comprises a server and an associated search engine.

Advantageously, the invention enables the user to terminate the session with the search server prior to the search results being generated, which enables more complex search requests to be processed.

Advantageously, the invention enables the user to receive search results more rapidly if the result is sufficiently conforming with the user preferences to be determined as a high priority. In this way, the user is provided with more relevant results faster.

A third aspect of the invention seeks to provide a method of according to claim 13. Preferably, the user identity is associated with one or more static and/or dynamic addresses.   Examples of static/dynamic addresses include – an E164 address (please explain what this is/means), an IP address, a telephone number for a facsimile, a pager number.

Examples of a data source include any source of information which is available via the distributed computer system. The data source is preferably running the special search software (module #3) for greater functionality and better optimisation. In alternative embodiments the data source may comprise a web page.

The search result message may encapsulate the processed search result. Alternatively, the search result message may provide a key to enable a user retrieve the processed search result. For example, an SMS could be sent to alert a user of a particular search

result having being obtained and provide the user with a key (e.g. a code or encrypted message) which enables the user to retrieve video from a store. It is envisaged that such "alerts" will be very useful where a search result indicates a file has been located as it would enable the user to connect to the proxy server using a suitable bandwidth connection.

Advantageously, the invention supports SMS messaging to alert users to search results and providing a user with a key to enable the user to retrieve a file via a high bandwidth connection such as a WLAN. For example, if a video clip was located, a user might wish to access this from a WLAN because the file is too big to view/download over a dial-up bandwidth connection.

Advantageously, the invention enables the search process to be performed more efficiently by including additional information provided by the user preferences in the search request and/or using additional information provided by the user preferences to remove less relevant search results which are returned to the enhanced SIP server prior to these results being forwarded to the user. The invention thus enhances the RFC (please defined this) functionality of the server software over the normal search software which a server may have.

Advantageously, the search can be forwarded to the most appropriate user end terminal for the content of the search result.

Advantageously, the search can be forwarded to the user end terminal which the user is operating at the time the search result is forwarded. The SIP proxy server is able to store results which are received when an appropriate user end terminal cannot be identified as one which is being operated by the user. The SIP proxy server may then modify at least one search result or generate another form of notification to alert the user to the search result and to indicate to the user how the user may retrieve the search result.

A fourth aspect of the invention seeks to provide a user end terminal arranged to be operable by a user for use in generating a search request according to the method of any of the first to third aspects.

A firth aspect of the invention seeks to provide a proxy server arranged to receive a search request message from a user end terminal according to the fourth aspect, the proxy server being arranged to be used in a method according to any of the first to third aspects.

A sixth aspect of the invention seeks to provide a suite of computer programs arranged to implement a method according to any one of the first to third aspects, the suite of computers being provided on the distributed computer system.

A seventh aspect of the invention seeks to provide a signal carrying a search request message generated by a method according to any one of the first to third aspects over a communications network comprising the distributed computer system.

An eighth aspect of the invention seeks to provide a signal carrying a search results message generated by a method according to any one of the first to third aspects over a communications network comprising the distributed computer system.

A ninth aspect of the invention seeks to provide a communications network arranged to communicate a signal according to either the seventh or eighth aspects of the invention.

The preferred features of the invention as set out by accompanying the dependent claims may be combined with any of the aspects of the invention as set out by the independent claims in any manner which is apparent to those skilled in the art.

Specific embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 shows schematically a SIP-supported data retrieval system according to an embodiment of the invention;

Figure 2 is a flowchart showing schematically steps in a method of searching for data according to an embodiment of the invention;

Figure 3 shows steps which occur at an end user end terminal in a method of method of searching for data to be retrieved from a distributed computer system according to an embodiment of the invention;

Figure 4 shows schematically an example of the fields in a SIP header and Search Description Protocol according to the embodiment shown in Figure 3; and

Figure 5 shows schematically an embodiment of automatically completing a transaction to secure an item returned by the search result according to another embodiment the invention.

The best mode of the invention as currently contemplated by the inventor will now be described by means of specific embodiments of the invention.   The best mode of the invention as currently contemplated by the inventors is supported by the session initiation protocol (SIP).   SIP is the Internet Engineering Task Force's IETF's standard for multimedia conferencing over IP.   SIP is an ASCII-based application-layer control protocol and is defined in RFC 2543, a copy of which is filed herewith and the contents of which are incorporated by reference.

SIP can be used to establish, maintain and terminate calls/sessions between two or more end-points.   More specifically, SIP provides session management within a packet telephony network which provides the ability to control the attributes of an end to end call as well as signalling which enables call information to be carried across network boundaries.   Thus SIP provides the ability to: locate the endpoints via address resolution, name mapping and call redirection; determine the media capability of an end point; determine the availability of an end point; establish a session; handle the transfer and termination of a call; and have an identity associated with one or more address mappings, as is well known in the art and defined by RFC 2543.

Those skilled in the art will recognise that although the invention is described in the context of the SIP protocol as described in RFC 2543, the invention is not limited to the SIP protocol per se but extends to any protocols derived from the SIP protocol which

support the SIP functionality used by the invention. For example, the invention can be implemented by any protocol which enables a proxy server to: locate the endpoints via address resolution, name mapping and call redirection; determine the media capability of an end point; determine the availability of an end point; establish a session; handle the transfer and termination of a call; and map an identity to a number of static and/or dynamic addresses, providing the protocol also enables a search session to be given a unique search identity by proxy server search software, and providing the search is been initiated by a user registered with the proxy server and assigned unique user identity having the above properties, and providing the proxy server is able to associate the user identity with one or more user preferences. These features of the protocol are necessary to enable the proxy server to modify and/or filter the search query as appropriate and to select a user end terminal to forward the results to in an appropriate format.

Referring now to Figure 1 of the accompanying drawings, a distributed computer system over which data can be retrieved using a search method according to the invention is shown. In Figure 1, a SIP-supported data searching system for retrieving data using a distributed computer system according to an embodiment of the invention is shown. The SIP-supported data retrieval system comprises a plurality of devices supported by appropriate software modules enabling the devices to interface with each other over the distributed computer system.

The distributed computer system shown in Figure 1 comprises a communications network which includes at least one user operable end terminal 10, a SIP proxy server 12 and at least one data source 14. The end terminal 10 may comprise any type of device capable of relaying information to the SIP proxy server 12 in the form of a search request. As shown in Figure 1, for example, a personal computer 10a or a mobile phone type device 10b capable of connecting over the communications network to the SIP proxy server 12, which may its self comprise a plurality of components, for example, a central server 12a and a data storage facility 12b, which may for example provide a database of user preferences and/or past search results, or search results which have yet to be communicated to and/or retrieved by a user who has submitted a search request. In certain embodiments of the invention, the SIP proxy server 14 may itself comprise a distributed computer system, for example, the proxy server may retrieve the

user preferences from a separate data base storage system via a communications network.

Those skilled in the art will realise that a variety of forms of connection (wireline, wireless, dial-up, broadband ASDL etc, LAN etc connections) are possible and that the end terminal 10 could be a portable device.   As the connection need not be permanent an end terminal 10 which sends a search request to the SIP server 12 does not need to remain connected to the SIP server 12 after the search has been sent to the SIP server 12. The invention enables an appropriate end terminal 10 to be located for forwarding a search result to, according to one or more user preferences established by the user and/or by the end terminal software and/or proxy server software. A user end terminal 10, the SIP proxy server 12 and a data source 14 interface with each other either directly or indirectly as appropriate according to specific embodiments of the invention, for example, search results returned by a data source 14 may be sent (if a user preference/search request permits it) directly to an end terminal 10 in one embodiment of the invention.

Referring now more specifically to Figure 1, two end terminals 10a, 10b shown by way of example comprise a personal computer-type 10a and a mobile telephone type device ,10b. End terminals 10a,10b are each capable of being connected independently to other elements in the computer system, i.e., to a the SIP proxy server 12 and to at least one data source 14. It will be appreciated by those skilled in the art that the data source 14 from which or via which information is retrieved does not need to be limited to the specific examples 14a,14b,14c shown in Figure 1. In Figure 1, data source 14a comprises a web server, data source 14b comprises a search engine (or database), and data source 14c comprises a phone terminal.

A plurality of software modules #1, #2 and optionally #3 are provided, components of which may be localised on an individual device or may be distributed across one or more devices. Software module #1 comprises end terminal software (ETS) which runs on the user end terminal 10a and interfaces via SIP user agents with software module # 2 which comprises SIP server software (SSS) run by the SIP proxy server 12.

Software module # 3 is provided optionally at the data source 14. The data source 14 may comprise, for example, a conventional search server or even a phone type device such as 14c in Figure 1, which may not be provided with software module # 3. For example, consider where the proxy server 14 is querying a conventional search engine such as Google™, and where no new software is provided (i.e., if software module #3 is not present on the device queried), for example, the web server 14a in Figure 1.

Although Google™ can be queried in a conventional way, Google may later provide an API (Application Programming Interface) which could enable more complex, enhanced or more efficient SIP searches to take place.   Alternatively, the proxy server 14 could have processes a returned search result to determine that a specific web-site should be resent the search request formatted in a specific way, for example a travel web-site for checking or booking flights. Such a web-site may operate in a SIP-enabled or non-SIP enabled manner. As an example, in Figure 3, software module # 3 comprises search database/engine software SDB which runs on the search server (equivalently known as the search engine) 14b.

The term end terminal 10 as used herein refers to any device suitable for generating a search request and/or receiving a search result. The user end terminal 10 can comprise a personal computer type device 10a as shown in Figure 1, however, those skilled in the art will appreciate that the user end terminal 10 may comprise any device capable of remotely accessing the search engine and/or displaying search results, for example, a personal digital assistant type device such as the PalmPilot™, or a mobile telephone type device 10b such as is shown in Figure 1, which a user can operate.   The end terminal 10 to which the search result is sent may not be the same end terminal 10 which generated the request.

In one embodiment of the invention, the end terminal 10 which receives the search result is not capable of generating a search request, but is capable of displaying a search result (for example, the user end terminal 10b may comprise a mobile phone type device which does not have sufficient memory capacity to support the generation of a search request, but which can receive a search result in the form of an small message service (SMS) text message).

A user of an end terminal 10 is assumed to have set up a SIP identity URI, in the manner described in RFC 2543 for example, and requests a search by entering an appropriate search query into an appropriate search application. The search application can provide any appropriate interface for the user to enter search terms, and it will be appreciated by those skilled in the art, that whilst a computer type terminal such as is shown in Figure 1 would support a sophisticated Graphical User Interface, if a search were to be requested by a less sophisticated device, the user interface can be much simpler.

Figure 2 shows steps in a method of searching for data to be retrieved from a distributed computer system according to the invention.

In Figure 2, in step 20, a user initiates a SIP search session at an end terminal 10 and generates a search request which will include information on the user's SIP identity. The user's SIP identity could be entered either manually by the user as part of the search request but in the best mode of the invention is generated automatically as a result of the user initiating the SIP search session.

The search request comprises at least one search criterion and is generated using an appropriate search software application adapted to interface with the ETS (end terminal search software module #1). When the search is requested by the user, the search software application passes the search request to the ETS. The ETS software module then modifies the search request according to at least one user preference in step 21.

A user preference used to modify the search result at the end terminal 10 may have been determined in a variety of ways. For example, the user preference may have been either predetermined by the user who has entered a personal profile comprising a set of one or more user preferences (for example, no interest in football or strong interest in Bath as a town/place but not as a bathroom item). The ETS software module will have associated such a user preference set with the user's SIP identity. The user preferences may be supplemented or replaced by one or more user preferences which the ETS software module has determined automatically from analysis of the user's historical search activities, i.e., by analysing which search results indicating a web-site resulted in the user visiting the web-site.

The ETS then encapsulates the search request within a SIP message in step 22 of Figure 2 using a search description protocol (SEDP) according to the invention, and sends this to.the proxy server.

The proxy server then passes the encapsulated search message to the proxy server software module SSS in step 23 of Figure 2, and the SSS then de-encapsulates the search request to process the request further according to the user preferences in step 24. The further processing of the search request may be based on additional user preferences which the proxy server has determined, for example, that results from a particular data source have historically resulted in the user being more likely to access the web-sites indicated in the search result, and the proxy server may then generate a user preference for that data source to be accessed again.

Alternatively, the proxy server may have a central scheme for discounting any price which is returned in a search result from particular types of web-sites according to a scheme which the user has subscribed to. The amount of discount may be fixed or vary according to certain conditions. The fact that discounts should be obtained and/or the details of organisations which the user is a member of could be provided as user preferences which are used to modify the search request.

The user preferences which the proxy server has noted may also vary and not be fixed, for example, according to the time the search is generated and according to the priority of the search. For example, the proxy server may note the search is urgent and so will always notify the user immediately a result is received, even if the user preferences forwarded by the ETS indicate a user preference for not notifying immediately). Thus one or more proxy server user preferences may in some embodiments of the invention, override one or more end terminal user preferences.

The proxy server then processes the search result and forwards it to a data source in the appropriate format in step 25, for example, either as an email or a normal search request to a non-SIP enabled search server such as 12a shown in Figure 1, or even convert the search request to a suitable query and connect to a telephone data source 14c such as Figure 1 shows.

The data source 14 then processes the search request to generate a search result which is conveyed as a search result message to the proxy server 12 in step 26. Depending on the type of data source, the search result may comprise a audio file, for example, if the data source is 14c, the person answering the query may have their answer recorded as a voice-memo and stored in an audio format. The answer may however, be converted at some suitable point using speech to text technology to a text file, and the search result would then have a more conventional format.

The user may have set up a preference to convey an indication with the search request that search results should be sent directly to the user's end terminal in some embodiments of the invention. For example, if the request is very urgent or if the user has a preference set up that results returned in email format should be forwarded directly to the user's mail server and not returned for further processing by the proxy server. This direct return of the search results option is not indicated in Figure 2, as in general the search results will be processed by the SIP server to determine an appropriate location for the results to be stored and/or sent to an end terminal.

The proxy server 12 de-encapsulates the search message it containing the search result then processes the search results received, and generates a search result having a format compliant with the user preferences and/or with the end terminal to which the proxy server has determined the results should be sent to in step 27.

Unlike a conventional search request, which may simply return a website where a user must then re-enter additional information if the user generates a search request for "cheap flights to Egypt", the SIP proxy server 12 is able to process the search result to enable further interrogation of a data source to determine more relevant search details. This further interrogation may be enabled either by the initial processing performed in step 24 of Figure 2, or as part of an iteration of the search process steps 24 to 26 performed within the processing performed in step 27 in Figure 2, prior to delivering this to the user end terminal.

As an example, if data source 14a returned a URL for a web-site for a travel company that has an on-line booking system, the SIP proxy server may already be aware of the

format the on-line booking system would require to find out specific details of flights and would then provide information to enable the booking system form to be effectively filled in. Alternatively, the SIP server may interrogate the booking system to determine the information required. Once the SIP server has obtained a specific result which conforms with the user's search request to the level required (i.e., specific flight information has been obtained), the SIP server forwards this information as a search result to the user. If the SIP server is aware that the user has frequent flyer miles or is a participant in another discount scheme (either as an individual, or if some organisation the user is a member (and which is recorded in his user preferences) has a discount scheme), this information might also be submitted by the SIP server, so that the user is also given information on the price of a flight which takes his frequent flyer miles into account. In this way, the search results returned by the SIP server are much more relevant to the user. In a similar manner, car insurance sites, theatre ticket sites, etc., and all be further interrogated to get specific information relevant to the user's initial search enquiry.

The method of encapsulating the search within a SIP message is performed using any suitable search description protocol (SEDP) which can be devised to provide a structure to the search request generated by the user at the end terminal 10. For example, in one embodiment of the invention, the SEDP provides a structured search request format which includes fields to indicate a set of search characteristics. The search characteristics provided indicate the type of search and a range of at least one search criterion, and may optionally include one or more user preferences. The one or more user preferences can be generated by the end terminal SIP software module #1 or by the proxy server software.

Figure 4 shows an example of a SEDP, and is described in more detail later on, but in general a an search description protocol according to the invention will support one or more of the following characteristics:

       Security (encryption);

       User SIP id;

       a variety of search descriptions fields (eg XML/free text/keyword selection);

       information on current session context (what user has been doing eg Email, how long connected, how long on current IP address,....); and

information on cached recent searches on terminal (eg large files might be held on the terminal and should not be sent again).

Those skilled in the art will appreciate that Figure 4 shows only some features of a search description protocol SEDP according to the invention and another protocol which is able to encapsulate the search request within the SIP message could be implemented instead. The essential feature is that any search description protocol needs convey at least the search request information and the user's SIP identity universal resource indicator (URI). In one embodiment of the invention, the ETS may be configured to format the search string the user has entered so that this conforms with a more efficient search expression. In another embodiment of the invention, the ETS may cache one or more previous searches. This enables the ETS to add updated information to a cached search to facilitate the search request process.

Returning to Figure 1, a user terminal generates a search request which is encapsulated by the end terminal SIP software. The encapsulated SIP message is then transmitted from the user end terminal to a SIP proxy server 12 with which the user has registered the user end terminal as a SIP terminal 10. The SIP proxy server 12 may have several registered user end terminals which the SIP proxy server is able to determine are associated with a particular user SIP identity.

When the SIP proxy server 12 receives the encapsulated SIP message, the server forwards the encapsulated message to the SIP proxy server software module #2 SSS. The SSS software module then processes the received message to de-encapsulate it. The SSS software module then analyses the search request in accordance with a predetermined set of search rules which are configured by the SSS and which may be determined at least in part by at least one user preference which the SSS is able to associate with the user's SIP identity URI.

In one embodiment, the SSS software module may further modify the search expression and/or select specific servers within the distributed computer system to forward the search expression to according to the user preferences associated with the user's SIP identity URI.

The search is modified in accordance with any specific user preferences. The user preferences which are used to modify the search may be a subset of the total user preferences which are available, and the SIP proxy server 12 may select the user preferences to be used to modify the search by analysing the search request and determining which user preferences are appropriate to the search. For example, the SIP proxy server 12 may select a user preference to indicate search results should be sent to home if they relate to a leisure activity and to work if they relate say to financial items, so that the user preference for which end terminal results should be sent to is selected according to the type of content which the user has requested. By incorporating user preferences, the SIP proxy server software can perform certain additional steps to ensure any personal preference information associated with the user's SIP identity is incorporated into the search request as a supplementary search expression, or use the users personal details to perform a supplementary search to obtain more relevant results, or even purchase an item located by a search.

For example, the SIP proxy server 12a may access database 12b to retrieve a set of at least one user preferences which are associated the user's SIP identity, such as the user's hobbies, the user's search preferences, the user's past search results, the user's past user actions after search results, and the user's most frequently accessed web pages. These user preferences are then used to reconfigure the search request. The user preference information could be used by the SIP server to add supplementary search expressions which include negative search criteria. For example, a user preference to indicate that unless expressly entered as a key word, no results should refer to a specific keyword should be included. In this way, a user can set a user preference for a keyword such as "Football" to not feature in any search results. The SIP server then can modify received search requests to automatically include in the search expression information equivalent to the boolean expression "AND NOT football". The modified search expression then results in search results being returned to the user which exclude football-related information. This is advantageous as if the user's preferences indicate the user wishes to exclude search results for football related sites when a search is being performed over a communications information network such as the World Wide Web on the Internet, a search for "Manchester" for example, would not result in search results being forwarded to the user which referred to "Manchester city" or "Manchester United" or any other football related site which mentioned "Manchester".

The user's preferences may include search site preferences which would indicate one or more search sites are to be included (and/or excluded search sites) in the search, a maximum search time for the search to be active, and search result terminal and/or result formatting information.

The SIP server 12 then selects a number of search engine/server/sits in further SIP messages.   The further SIP messages may be encapsulated or may not be according to whichever form is most suitable for the specific server being queried. For example, some messages could use a new protocol if a server was equipped with an appropriate search interface – API) between the SSS and SDB. The protocol would need to have one or more (ideally all of the following features):

     be secure (e.g. the protocol might use Ipsec);

     provide authentication – for example, the protocol might require authentication of servers (to check for Fakes);

     support compression (of the query and/or of the result); and

     allow caching on the SIP proxy ideally (at a very high level, for example, if a highly popular football team scored a goal and the number of users who may search for a video clip of this to download could reach as high as 10 million, however, the SIP server would only need to retrieve this video clip once !).

More than one protocol could be utilised to transport the SIP messages, for example, if a SIP Proxy server needs to provide queries in a number of ways, for example, the server could send a normal email to a mailing list requesting more information on the search expression (or an expression derived from the search expression), or even (using a suitable automatic voice generation application) phone a hotel, or fill out a Web form (all of which forms of further querying use different transport protocols).

As an example, in a typical query message according to the invention, the following information could be provided:

     Origin IP address:123.32.123.001

     Origin URI :name.surnameofuser@atelco.com

     Hash:4387t84gf8t4f84tg83rtf8p32yh239f8y[98fy9[8747643865gffgyfrjylegfgv,ueg yvjgvy

Search reference: 653467252

Search terminal type = Pentium III PC

Account type: Individual

Average internet access activity duration: 2 hours .

Previous Activity: email

Location of terminal: Ipswich, England

Request type: TRAVEL

Request: Date 23/1/04;

From: Stansted;

To Moscow;

Time: unspec;

Cost CHEAPEST;

Return No

End ReqType

Return:: Instant(123.32.123.001), update (day, Mobile- name.surnameof

user@atelco.com)

Cost – Bill 1

END

Each search is assigned a unique search number by the SIP proxy server 12 so that the SIP server 12 is able to match any replies to the original search request even if the user is not longer in communication with the SIP proxy server 12 via the user end terminal 10.

When the SIP message carrying the search request is received by a data source 14, typically an information source such as a search server 14b, the message contents are extracted and are processed by the appropriate SIP software module located on the other server, e.g. the search engine SDB software module #3 located on the search engine of a search server. Alternatively, if the SIP server chooses another transport protocol, the message contents may be processed in the normal way (eg Web form) for the site queried, for example, as would happen if a conventional search engine (i.e., non 'SIP enabled) were queried by the SIP proxy server 14. ,Also, if a SIP server 14 forwards the search request to a data source such as a mailing list or email address for a particular body or organisation of interest regarding the search request (whose addresses may have been located by earlier search requests by the user or provided by

a preliminary search result generated by a conventional or SIP search engine), the data source will not be SIP enabled.

When a search request message is received by a data source 14 , if the data source 14 determines one or more results to the search criterion/criteria set by the user's search request, the data source will forward the search results in an appropriate manner to the SIP proxy server. Where a SIP server 14 has actually telephoned a number and announced the search using text-to-speech technology, the person who responds to the search may be given a number to contact and a password so that they can respond later to the query. When the person dials the number, they may be presented with the option of entering the code, and then be allowed to record a message. The message can then be associated with the SIP identity of the user and the search identity using the code entered. This then enables the message to be forwarded to the SIP server which might convert the audio file to a text file using speech-to-text technology, or forward the file to the user as a search result for the user to play on their machine. A similar process is undertaken where the SIP search message is forwarded to an email or mailing list address so that any response can be identified by the SIP proxy server with the user's SIP URI (or key to get information at a later point in time (see the description above).

When a SIP enabled search engine 14b encapsulates one or more results in a SIP message together with the unique search number and forwards this to the SIP server, this enables the SIP proxy server 12 to associate the search result with the SIP identity of the user who requested the search.

When the SIP proxy server 12 receives a SIP message it extracts the search result and search number. The SIP proxy server 12 associates the search result with the SIP identity of the user who requested the search. The SIP proxy server search software module # 2 SSS may store results for a specific search number according to the set of user preferences for a predetermined period of time or until a specific number of positive search results are received. Null search results can be forwarded by the SIP proxy server to the user and/or near matches provided in accordance with the user's preferences.

The SSS software module then determines the user's current location (as located in the SIP location database), the user's terminal type at that location and format (determined in accordance with the user preferences). For example, if the user does not wish to receive the search results until a certain time, or does not wish to be disturbed, if this information is recorded on the SIP database of SIP user preferences, then the SIP proxy server is able to process the search results appropriately and format the results for the appropriate terminal display.

The user may also specify more than one location for results to be sent to, for example, a short descriptive form (for example, just a town if the user has search for a company's location) may be sent to the user's mobile phone, which could alert the user to log into their personal computer (to which the SIP proxy server software would have sent a SIP message which encapsulated the full address of the firm as a search result).

As SIP associates currently valid addresses with a SIP user ID, and uses these to deliver the search results there is not need for a user to retain an open search session with the search engine whilst the search is being performed. The search can use permanent SIP addresses which enables results to be collated and a user is therefore also able to specify if, for example, they wanted results to be returned collected into 10 "hits" until the search time has expired, after which any remaining searches should be sent to the user.

As the user is able to designate the terminal and format the search results are to be provided by, it will be appreciated by those skilled in the art that the search results could be provided in form which is accessible when the user next runs the search software module #1 search application, or alternatively be sent in the form of an electronic mail message (e-mail message) or short message service (SMS) message.

As the protocol user identity associated with the user, for example, the SIP URI name.surnameoftheuser@atelco.com, is permanent, this can be associated with a number of addresses/phone numbers which may be static or dynamic, for example, with telephone number such as 01234 123 456 or an address such as 111.223.123.011...)

Another aspect of the invention relates to a distributed search environment in which the SIP proxy server search software module #2 determines the capabilities/specialities of one or more search engines/servers within the distributed computer system. For example, this could be achieved by sending a request for information to the search engines/server, but other mechanisms which can be used include web crawling (for example, such as Google™ implements) or by being sent advertisements, or any other way in which it is possible for the proxy server to discover their capabilities/specialities. The search software running on these machines uses another protocol (Search Capability Protocol CCP) to describe their capabilities (for example, speed, data bases searched, the type of files searched (e.g. *.doc, or *. pdf file names), etc. to the SIP proxy server 14. The SIP proxy server 14 is then able to determine which search engine is most suitable for a user and/or a specific search requested by the user, for example, by considering the search request, user preferences.

Example 1.

A specific embodiment of the invention will now be described by way of example with reference to Figures 1 and 2 of the accompanying drawings.

Consider a user who wishes to locate information on trams. The user has a history of accessing many tram and transport related web-sites on the Internet, has transactions which record the purchase of model trams, and is listed on at least one transport enthusiast email list.

The SIP proxy server has recorded this information in association with the user's SIP identity and the user is assumed to have set their preferences to indicate that they are interested in transport. Accordingly, both the ETS software module and the SSS software module will record this information as if the user has used SIP for all of their sessions, including browsing, email and Instant messaging, all the information built up about the user's information sources and preferences will be accumulated in association with the user's SIP URI identifier – for example users.name@businessname.sip.

Repeated use by the user of the information retrieval search system according to the invention will result in the user having activated (for example by clicking on a highlighted URL returned with the search results) features which fall into the set (site type =

museum, request = information,...etc) and this information will be stored on the SSS. Other data mining of the user's previous sessions can also be used to optimise the search to suit the user's preferences.

Consider the user has the specific request of wishing to restore an old tramcar and so the user enters the search phrase "tram, restoration, projects, buy" in step 20 of Figure 2. The user may naturally supplement these search terms with appropriate Boolean operators and wild card characters etc, however, a simple key word such is given here as an example with the implicit assumption the key words are separated by commas and link by an inherent "AND" so that all the key words must be present before the search results are returned.

The ETS software then parses the search request to indicate additional information which is accessible to the ETS software in step 21 of Figure 2, for example:

Search terminal type = Pentium III PC
Account type: Individual
Average internet access activity duration: 2 hours
Previous Activity: email
Location of terminal: Ipswich, England

...

This request is then packaged, using the Search Description Protocol, in a standard SIP message in the manner described in RFC 2543 and transmitted along a communications link to the SIP proxy server 12 in step 23 of Figure 2.

The SIP proxy server 12 then passes the (unopened, i.e., still encapsulated) message to the SSS in step 24 of Figure 2. The SSS is an "intelligent module" capable of making requests to a large number of databases and specific sites or search engines (some but not all of which may have SDB software modules). As an example, the SSS can send the request to one or more of a plurality of different information forums, for example:

i)   the SSS can send a request to a news group on trams in the form of a request for information which the SIP server automatically generates;

ii)   the SSS can send the request to a transport web-site that logs potential
        projects and restorers (and tries to match the two) which has SDB
        software which enables the two software modules to create a user entry
        (as the user might need screening from replies this might be to an email
        account: 876462965@atelco.com which is created just for this search
        entry alone, and which would therefore screen the user from spam email
        which might otherwise be generated if the user's normal email address
        was given);

iii)   the SSS can send the request to a standard search engine such as
        Google™ (www.google.com or www.google.co.uk) from which the SSS is
        able to request a specific number of results, for example, 1000
        responses. The SSS then filters the responses provided by the
        conventional search engine to ensure that the search results conform with
        the user preferences the SSS is aware of for the SIP user identity which
        requested the search.   The SSS can further interrogate the user if the
        SSS detects that ambiguous results are being generated (for example, by
        using a built in statistic/pattern matching program the user could be asked
        "Do you mean you want to BUY a TRAM?"). The SSS can then
        incorporate the user's response to such a further query to refine the
        search terms the SSS uses to interrogate standard search engines;

iv)   the SSS can send the request via email to one or more other individuals
        or mailing lists who/which the SSS is able to determine have associated
        with trams as a subject matter of interest; and

v)   the SSS can send a request via email to a museum such as the national
        transport museum.

Example 2

Figure 3 shows in more detail steps in the process of generating search request at the
user's end terminal. In Figure 3, in step 30 a user initiates a search session at the user
terminal, for example, using either text or speech (and a suitable application to generate
text from the spoken search request). The ETS parses the search request to identity a
possible pro-forma it is aware of for that type of enquiry in step 31, for example, if the
search has a travel or financial aspect. This enables direct interrogation of web-sites
such as travel sites, and may remove additional processing of search requests/results by

the proxy server such as were described in the context of step 27 in Figure 2. If additional information is needed, the ETS may request this of the user and if the ETS detects a mistake, then it may query this with the user. In the context of a travel enquiry, the ETS may provide the user with a generic form which requests departure dates, cost preference etc, and if the departure date is before the arrival date detect this as a mistake.

The ETS checks to see if previous searches have been performed in step 33. For example, the user may have requested the same information a few days earlier, in which case the generic form may be presented to the user with appropriate information already completed, or the ETS may alternatively have cached some search results. If a similar search has been recently performed and is held in cache on either the end terminal or on a server such as the proxy server 12, then only an update needs to be sent to the user.

The ETS then formats the search request in step 34, for example, the travel search request may have a pre-set "destination, time, departure point, time" field format.

The ETS then encrypts the search request with a session key in step 35, which was established when the user authenticates at the start of the association of the address of the end terminal and the SID id.

The ETS then places the encrypted payload in a SIP message with TYPE set at SEDP (the search description protocol) in step 36.

The ETS then sends the SIP message to the proxy server in step 37.

Figure 4 provides an example showing the format of a SIP header and SEDP search description according to an embodiment of the invention.

The SIP header includes at least the following information:

i)   INVITE sip:search@bt.co.uk SIP/2.0 – this indicates the SIP header relates to the invitation from the SIP server to a search engine

ii)   VIA: SIP/2.0/UDP spainltel:5060;

iii)   From: Joe Bloggs<sip:joe@atelco.net> - this is the SIP URI of the user;

iv)   To: Search <sip: search@uk.net> - this provides the SIP URI of the search

           service; .

v)   Call-ID: 10000001@atelco.net – this is the call of the SIP session, which can

           terminate early before the search result is returned;

vi)   Cseq: 1 INVITE – this is the sequence number of the SIP call;

vii)   Subject: Urgent Search – this could be a plain text entry or provided as a field

           which an end point uses;

viii)   Contact: Joe Bloggs <sip: joe@atelco.net>

Additional fields which the invention provides in the SIP header indicate the SIP payload,
and include:

ix)   Content-Type: application/SEDP – the type could be used to send an IP address,
but in general is used to indicate that instead of a MIME type application, the application
is a session description protocol according to the invention, SEDP (SEarch Description
Protocol);

x)   Content-Length: 160 – this indicates the size of the payload, the number 160 is
given by way of example only.

Figure 4 also indicates a SEDP according to an embodiment of the invention where a
travel enquiry forms the body of the search expression. As shown in Figure 4, the SEDP
comprises the following:

i)   Type: travel.air – the type field indicates a specific search field where
appropriate;

ii)   F= Luton; 13,4,04; d = Ulan Botar; 28,4,04; ; ; - these fields indicate the point of
departure is Luton, the departure date is 13 April 2004, the destination is Ulan Botar and
the return data is 28 April 2004, followed by a number of null fields.

iii)   AP = British A, NOT Aeroflot, other – these are user preferences which indicate
positive preferences (British Airways) and a dislike (Aeroflot)

iv)   P = Price – this field is being used to indicate that price is a priority feature of the
search

v)   U = instant; update (phone1)- this field is being used to indicate that the search results should be communicated to the user end terminal indicated by phone 1 instantly when they arrive.

vi)   T = urgent – this gives the priority of the search;

vii)   OS = Hotel, Car Hire, Insurance – these are other services which are relevant given the category of the search, so the proxy server may wish to report information on these services if they are returned by a data source;

ix)   Sid = 7684^^*jjkkj84 – this is the ETS session identifier which resides above the SIP id, and which may or may not be associated with SIP.

Fields ix) and x) in the SIP header (and so also all the fields in the SEDP search description in the payload) may be encrypted in some embodiments of the invention, as indicated in the steps outlined in Figure 3 of the accompanying drawings.

Example 3

Figure 5 shows an very specific embodiment of the invention in which a user indicates they want a hotel room in a specific location (for example Salzburg) for a specific duration (for example 2 nights) at a specific cost (under £30 a night) in a search request in step 50.

In step 51, the ETS passes the search request and asks for more information, for example, the number of people, the exact location, and type of room, and a start date.

In step 52, the ETS forwards the message to the SIP proxy server whose SIP search server software SSS then processes the message (having de-encapsulated it).

In Step 53, the SSS sends an initial search to several travel search sites, some of which have enhanced SIP search interfaces but some of which may be standard world-wide web WWW servers.

In Step 54, the results returned are negative as the price cannot be met. The proxy server then may ask the user for more information or to revise the search and/or ask if the duration of the search could be extended so that search results could be returned at

a later point, for example, 1 day later. In Figure 5, the user sends a response to the SIP server that it is possible to perform an extended search and for results to be provided 1 day later. The SSS then searches for hotels which do not have on-line booking facilities to determine email addresses and/or telephone numbers on travel web-sites and tourist information sites.

In Step 55, the SSS sends out email enquires in a format generated from the search request, and phones up hotels using text-speech and speech-to-text converters. The SSS obtains a near result and noting that the user is a member of at least one potentially relevant organisation, provides this additional information to the hotel providing the near result to obtain a discount, for example 10%.

In step 56, the SSS checks the user's location database and determines that an SMS would be most appropriate (for example, the SSS may recognise that the time is outside the usual range of hours a user operates their computer at home or work). The SMS informs the user that a room has been found which meets all of the search requirements and asks the user if the booking should be automatically completed. This option is possible as the user has already registered bank account/credit card details to enable automatic purchasing and may have set a user preference to indicate that automatic purchasing should be enabled. In other embodiments, the user may set a user preference to indicate that if all criteria are met, the purchase should proceed automatically without a prompt.

In step 57 of Figure 5, the SSS books the room by providing the financial information to the hotel either by email or by fax and informs the user that this has been done. In Figure 5, the SSS waits until a confirmation number has been received from the hotel and then forwards this by SMS to the user. Alternatively, the SSS could notify the user as soon as the financial details have been sent to the hotel, or have been indicated as having been received by the hotel (for example, in the case of an email being sent when a receipt for reading is received or in the case of a fax, when the fax is confirmed as successful).

As has been mentioned above with reference to specific embodiments of the invention, it is a feature of the invention that both the end terminal software ETS and the SIP proxy

server software SSS is arranged to modify a specific search expression (i.e., the phrase entered by the user on the end terminal) so that any requests for information which generated by the SIP automatically have an appropriate format for the destination to which the search request message is to be forwarded to.

The responses from these searches can be generated over several different timescales, ranging from virtually instantaneous for the conventional search engine results to several days, weeks, months or even years for the emailed requests for information. A user is able to indicate either in the search expression or as a user preference (which may be derived from the search expression), the maximum duration a search may be conducted for. This could be implemented by indicating to the proxy server 14 a cut-off time after which search results returned should be discarded. Search results which are returned to the proxy server 14 after the initial search session has terminated can be processed as the SSS is able to associate the results with the original request using the unique search identifier associated with each search (which can be given in a form such as 1234567@aserver.telco.umts)which is issued by the SSS. The SSS is then able to process response and may iterate the search procedure to obtain additional information as the search results arrive by processing the results before the results are notified to the user.

The form of the results and the mechanism by which the user receives the results can all be set by user preferences. Typically, the user might indicate that results should be provided in one or more of the following forms:

      i)   as a weekly summary of responses;

      ii)   as an instant reply (within 1 minute);

      iii)   only best match answers should be sent via email as high priority.

The user might always indicate that the search should be cancelled at any time, and this too can be easily accomplished as the SIP search number uniquely identifies the search. The user may also

The SSS can use the facilities of the SIP proxy server and its associated location database to locate the user at any given time (since the user's IP address is not a

reliable location after several minutes or hours). The location database returns the users current terminal type and the SSS is able to adapt the response to suit the user's current terminal. As an example, consider if a tram enthusiast responds to a news group item that he has a 1933 GEC/Norwich tram in his back garden in Felixstowe. The SSS is able to determine that the sender of the email is at a user end terminal located in Felixstowe, and the SSS is able to determine the distance to Ipswich is sufficiently close (by accessing an appropriate application/database) to rank highly favourably with the user in view of the user having set a user preference that results from locations within a 20 mile radius are to be given high priority. The SSS then locates the user as being mobile and so formats the result in the form of an SMS message to the user on his mobile phone.

The SIP server is able to assess the priority of a result according to its conformance with the user's predefined set of user preferences. If the SIP server considers the result to be urgent (which could occur either because the user designated the search as being urgent or because the user indicated that if the search result indicated a close location, or a cheap price etc) then the SIP server delivers the results to the user immediately (or within a timescale the user has given in his set of user preferences for urgent results to be delivered in) in the format the user has given in the set of user preferences. For example, an urgent search result could be set either to a user at his computer terminal if the user is currently logged on to the network at that terminal with his SIP identity, and/or (depending on the user preferences) the search results could be sent via an SMS or automatically generated vocal message to the user's mobile phone.

The user is able to generate a search query and set the user preferences indicate if results should be given in any format including audio. By providing search results in an audible format, persons who are visually impaired are able to receive search results in a more user friendly manner. It is possible for persons who are visually impaired to set their ETS software user preferences so that it generates a verbal confirmation of the search string they have entered (or to repeat a spoken search request if such a mode of search request generation has been used).

User preferences could be associated by the SIP server SSS software module with the senders SIP URI so that the search results are sent to a destination user end terminal

based on the search content (for example, video files could be sent to the user's work email address if this had a higher bandwidth connection to the internet than the user's home terminal equipment instead of the user's home email address). Alternatively, the SIP SSS software could be configured by the user preferences to automatically compress the search results to a predetermine bandwidth, for example, by sending still clips of a video file to one location and the full video file to another location. Alternatively, the SIP SSS software could simply notify the user that a large file was located by the search and store the large file on the SIP server for a predetermined amount of time until the user downloads the file.

For added security such centrally stored files may only be accessible if the user further enters a security key which the SIP server 12 could send either with the original notification that the file has been located and/or the address where the file could be accessed or via a separate notification. The SIP server does not need to use message type notifications such as vocal messages, email or SMS to notify a user of a search result. Instead, the SIP server may deposit a file containing the search results in the user's public drop file etc.

If the user has requests a search to locate an item for purchase, the SIP server could be provided with the user's financial information such as their credit card numbers etc. and any other information needed to make an automatic purchase of the requested item if the price conforms with the user's set preferences. As an example, consider a SIP server which polled a flight or holiday site for example, and located for example, a return flight to Cairo on the outward and inward dates the user has requested at a specific price. If the price is, for example, either below the user's "immediate purchase" limit or is the cheapest price of a set of search results returned within a given period of time for searching, the SIP server may effect an immediate purchase of the flight so that the price information is correct and the price does not change by the time the user receives the search results. It will be obvious to those skilled in the art that such an automated purchase scheme is not limited to the purchase of airline flights, but could be extended to any item or service offered for sale over a distributed computer system, including items which are under auction but which have an immediate purchase option.

As the proxy server is able to intelligently query certain locations which it believes would be more appropriate for the user's search query, the proxy server can return results which indicate a preferential arrangement with the site providing the search result. This is particularly so if a price is associated with the search query. For example, the search engines which the proxy server access could be configured to always provide a certain predetermined discount (which may be fixed or only temporary in duration). A SIP server search service can then be provided to users whose user preferences indicate they have subscribed to a specific group or body.

For example, if a user indicated they were a member of the Automobile Association and also a civil servant, and the user requested a search for the cheapest insurance for an "S-reg" Volkswagen Punto with ten years no claims bonus, the SIP server could provide this additional member information to the servers of the insurance companies it contacts and the results returned could indicate if an insurance company is able to offer an additional discount to the user based on the organisations indicated in the user preferences.

Alternatively, if may be that the Internet Service Provider (or equivalent body) that the user has subscribed to has discounts with certain third parties such as hotels, software providers, etc., and so the SIP server itself is configured by the Internet Service Provider to offer one or more discounts to the user when it returns a result from the third parties to the user.

The SIP server could keep track of the purchases the user makes with certain bodies and assign one or more points to the user according to the amount and/or number of purchases made, which could be reset within certain timescales. These "points" could then be spent by the user, for example, to get a certain discount off a returned search price or to get an item for free if the search returns a price for that item which could be bought outright with the "points" the user has. In this way, a "reward" scheme similar to the reward schemes currently offered by many chain store retailers can be offered to the user via the SIP search mechanism, whereby each item purchased attracts points and a user is able to purchase further items and/or discounts off other items with the points they accumulate.

Those skilled in the art will appreciate that the spirit and scope of the invention is not limited to the specific embodiments described herein above but instead is defined by the accompanying claims.

One embodiment of the invention is advantageous in a wireless environment where a user has a mobile terminal. The invention enables the SIP proxy server to notify the user where a large amount of data has been located. This enables the user to elect to move into a wireless "hot-spot", i.e., a region where a high bandwidth wireless connection is available to enable the mobile terminal to download a large amount of data.

Another embodiment of the invention enables a still image from a video image file to be extracted by the SIP server and sent to a user to indicate the type of content of a video image file. The user is then able to select whether the video image is to be downloaded. For example, if a user wanted to download a trailer for a remake of a classic film, a lot of video files might be detected which relate to the original film and not the remake. The invention advantageously prevents the user from downloading large video files which do not relate to the desired content.

Those skilled in the art will appreciate that notifications of search results may comprise in some instances the entire search result or a reduced data set (for example, just the title and artist of an audio file and not the audio file itself, or a still image of a video). The notification may be delivered electronically by any suitable means and may comprise an email message, sms message, a telephone call message (generated using suitable voice generation technology) or a multi-media mobile telephone type message

CLAIMS

1.   A method of searching for data to be retrieved from a distributed computer system, the method comprising:

generating a search request at a user end terminal comprising at least one search criterion;

modifying the search request at a user end terminal to indicate at least one user preference;

forwarding the search request to a proxy terminal arranged to forward the search request to a data source capable of retrieving data from the distributed computer system, the data source being capable of providing a search result to a user end terminal selected in accordance with one or more predetermined user preferences.

2.   A method as claimed in claim 1, wherein one of said user preference includes a criterion defining the extent to which a search result must conform to the search request before a search result can be communicated to a user end terminal.

3.   A method as claimed in claim 2, wherein the search result is forwarded by the data source to the proxy server, and the user preference includes a criterion to indicate that if a search result conforms sufficiently to the search request, then the search result is to be communicated by the proxy server to a predetermined user end terminal.

4.   A method as claimed in claim 1, wherein the search request indicates a priority indicator, and said user preference includes a criterion to indicate that if a search result is received with said priority indicator then the search result is to be communicated by the proxy server to a predetermined user end terminal.

5.   A method as claimed in claim 1, wherein the search result indicates a content indicator, and said user preference includes a criterion to indicate that if a search result is received with said content indicator, then the search result is to be communicated by the proxy server to a predetermined user end terminal.

6.   A method as claimed in claim 5, wherein the content indicator is assigned by the proxy server to indicate a type of file.

7.   A method as claimed in claim 5, wherein the content indicator is assigned by the proxy server to indicate a subject content of a file.

8.   A method as claimed in any one of claims 3 to 6, wherein the predetermined user end terminal is the user end terminal which the user is associated with at the time the proxy server receives the search result.

9.   A method as claimed in any preceding claim , wherein the data source comprises a server and an associated search engine.

10.   A method as claimed in claim 1, wherein the data source comprises one or more email addresses associated with a subject relevant to the search request and the proxy server forwards the search request in the form of an electronic email to the one or more email addresses.

11.   A method as claimed in claim 1, wherein the data source comprises an IP-PSTN gateway, and the proxy server forward the search request by phoning up a telephone number and speaking the search request using automated speech technology.

12.   A method as claimed in any preceding claim, in which the search result is provided in a medium and format suitable for the data terminal to which the search result is to be forwarded.

13.   A method of searching for data to be retrieved from a distributed computer system, the distributed computer system comprising at least one user end terminal capable of communicating with a proxy server, the proxy server being capable of communicating with at least one data source capable of retrieving information from the distributed computer system, the user end terminal being adapted to be operable by a

user who is registered with the proxy server with a unique user identity, the user identity being associated with a set of user preferences, the method comprising the steps of:

generating a search request at one of said at least one user end terminals, the search request indicating at least one search criterion to be met by the data to be retrieved;

sending a search request message encapsulating the search request to the proxy server;

associating the search request message with a unique search number associated with the user's unique identity;

forwarding the search request message to at least one data source arranged to process the received search request message;

performing a search according to the encapsulated search request;

sending a search result encapsulated in a search result message to the proxy server;

de-encapsulating the search result message;

processing the search result according to the set of user preferences;

selecting one of said at least one user end terminals according to the set of user preferences; and

sending an search result message encapsulating the processed search result to said at least one selected user end terminal.

14.   A method as claimed in claim 13, wherein the distributed computer system supports the session initiation protocol (SIP), and wherein the user end terminal is a SIP registered terminal, the proxy server is a SIP proxy server, and the user is registered at the proxy server with a unique SIP address.

15   A method as claimed in claim 14, wherein the search result message is a SIP message which is sent to the user at an address determined by the SIP proxy server to be the current location of the user who requested the search.

16.   A method as claimed in claim 15, wherein the search result SIP message is sent to a plurality of addresses associated with the user's registered SIP identity.

17.   A method as claimed in claim 14 or claim 15, wherein the search result SIP

message is sent to an address associated with a different user end terminal than the user end terminal operated by the user to send the search request to the SIP proxy server.

18.   A method as claimed in any preceding claim, wherein the user end terminal is a mobile device.

19.   A method as claimed in any preceding claim, wherein at least one user preference comprises a formatting user preference which indicates how the search result should be formatted.

20.   A method as claimed in any one of claims 1 to 8, wherein at least one user preference comprises a formatting user preference associated with a type of user end terminal.

21.   A method as claimed in any previous claim, wherein the method further comprises the step of the proxy server modifying at least one search criterion in accordance to at least one user preference;

22.   A method as claimed in any previous claim, wherein the method further comprises the step of the proxy server modifying the search result according to at least one user preference.

23.   A method as claimed in any previous claim, wherein the at least one data source to which said search is forwarded to by the proxy server is determined by the proxy server in accordance with at least one user preference.

24.   A method as claimed in any previous claim, wherein the proxy server processes the returned search result to remove at least one result which is indicated by at least one user preference as not relevant to the user's listed interests.

25.   A method as claimed in any previous claim, wherein the proxy server processes the returned search result to modify any returned cost value for an item or service

indicated by the search result, the modification being according to a discount scheme associated with a user preference.

26.   A method as claimed in any previous claim, wherein the proxy server processes the search result to prioritise the delivery of at least one item listed by the search result to the user in accordance with number of search criteria said at least one item conforms with.

27.   A method as claimed in claim 26, wherein the proxy server alerts the user to a search result by encapsulating the search result in a small message service SMS message which is sent to the user over a communications network.

28.   A method as claimed in any previous claim, wherein the search request is generated by the user end terminal modifying a previously stored search request in accordance with at least one updated search criterion.

29.   A method as claimed in any previous claim, wherein the set of at least one user preferences specifies a maximum time limit for the search results to be generated.

30.   A method as claimed in any previous claim, wherein the distributed computer system is connected over a communications network.

31.   A user end terminal arranged to be operable by a user for use in generating a search request using the method of any of the previous claims.

32.   A proxy server arranged to receive a search request message from a user end terminal as claimed in claim 31, the proxy server being arranged to be used in a method according to any of claims 1 to 30.

33.   A suite of computer programs arranged to implement a method according to any one of claims 1 to 30, the suite of computers being provided on the distributed computer system.

34.   A signal carrying a search request generated by a method according to any one of claims 1 to 30 over a communications network, the communications network comprising the distributed computer system.

35.   A signal carrying a search result generated by a method according to any one of claims 1 to 30 over a communications network, the communications network comprising the distributed computer system.

36.   A communications network arranged to communicate a signal according to either claim 34 or claim 35.

37.   A method as claimed by any one of claims 1 to 30, in which a notification of a search result is sent by the proxy server to an end terminal prior to the search result to which the notification relates.

38.   A method as claimed by claim 37, in which following delivery of the notification, the user connects to a high-bandwidth connection than the connection used to receive the notification.

ABSTRACT

A method of searching for data to be retrieved from a distributed computer system, the method comprising: generating a search request at a user end terminal comprising at least one search criterion; modifying the search request at a user end terminal to indicate at least one user preference; forwarding the search request to a proxy terminal arranged to forward the search request to a data source capable of retrieving data from the distributed computer system, the data source being capable of providing a search result to a user end terminal selected in accordance with one or more predetermined user preferences.

FIG. 3

Phone

14c

12b

Re-configure
Request using:
Preferences
Past results
User location

Speech<->text

SIP User Agent

Search Software Module 3

Advertise
Services

Search Engine
or Database

14b

Search Software Module 2

12a

10b

SIP Proxy
Server

HTTP

Web
Server

14a

User

Format request

Search Software Module

SIP User Agent

10a

Figure 1

USER INITIATES SEARCH SESSION AT USER TERMINAL AND GENERATES SEARCH REQUEST — 20

USER TERMINAL SOFTWARE (ETS) MODIFIES SEARCH REQUEST — 21

ETS ENCAPSULATES SEARCH REQUEST IN SIP MESSAGE, AND SENDS TO PROXY SERVER — 22

PROXY SERVER PASSES ENCAPSULATED SEARCH REQUEST MESSSAGE TO PROXY SERVER SEARCH SOFTWARE (SSS) — 23

PROXY SERVER SEARCH SOFTWARE SSS DE-ENCAPSULATES SEARCH REQUEST, PROCESSES REQUEST ACCORDING TO USER PREFERENCES — 24

THE PROXY SERVER FORWARDS PROCESSED REQUEST TO DATA SOURCE IN APPROPRIATE FORMAT — 25

DATA SOURCE PROCESSES SEARCH REQUEST, GENERATES SEARCH RESULT, DATA SOURCE FORWARDS SEARCH RESULT MESSAGE TO PROXY SERVER — 26

PROXY SERVER DE-ENCAPSULATES SEARCH MESSAGE, SSS PROCESSES SEARCH RESULT AND DELIVERS IN ACCORDANCE WITH USER PREFERENCES TO DESIGNATED USER TERMINAL(S) — 27

Figure 2

USER INITIATES SEARCH SESSION AT USER TERMINAL – either using text or speech | 30

ETS parses search request – identifying possible possible pro-forma (eg travel, financial…) | 31

ETS Requests additional information or queries possible mistakes (eg departure date before arrival date, cost preference..) | 32

ETS checks cache for recent similar searches – if similar search is held in cache on the terminal or the server then only updates need be sent | 33

ETS formats search request – eg Travel requests have pre-set destination, time etc fields.. | 34

ETS encrypts request with session key (established when user authenticates at start of association of address and SIP id) | 35

ETS places encrypted payload in SIP message with TYPE set at SEDP (Search Description Protocol) | 36
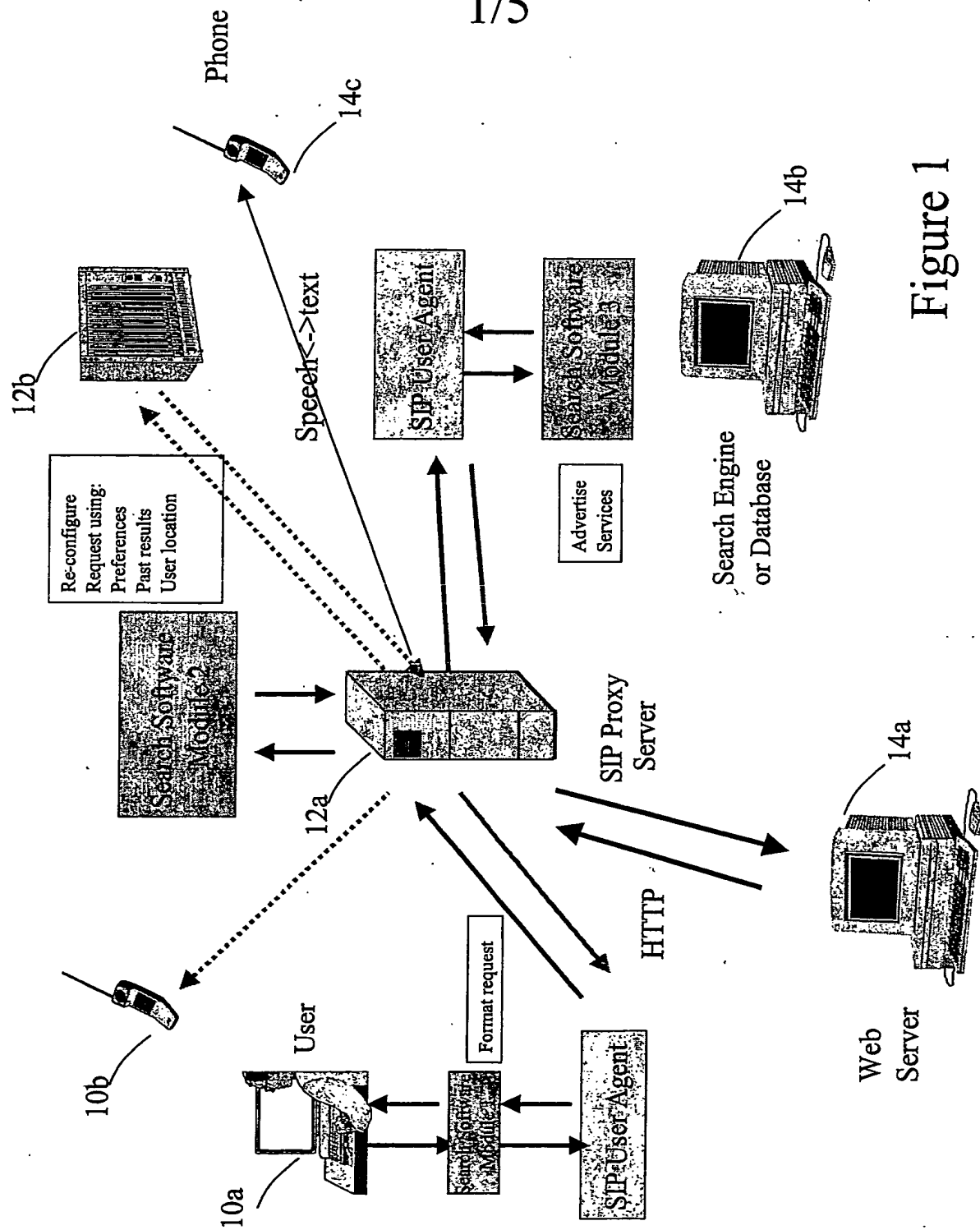
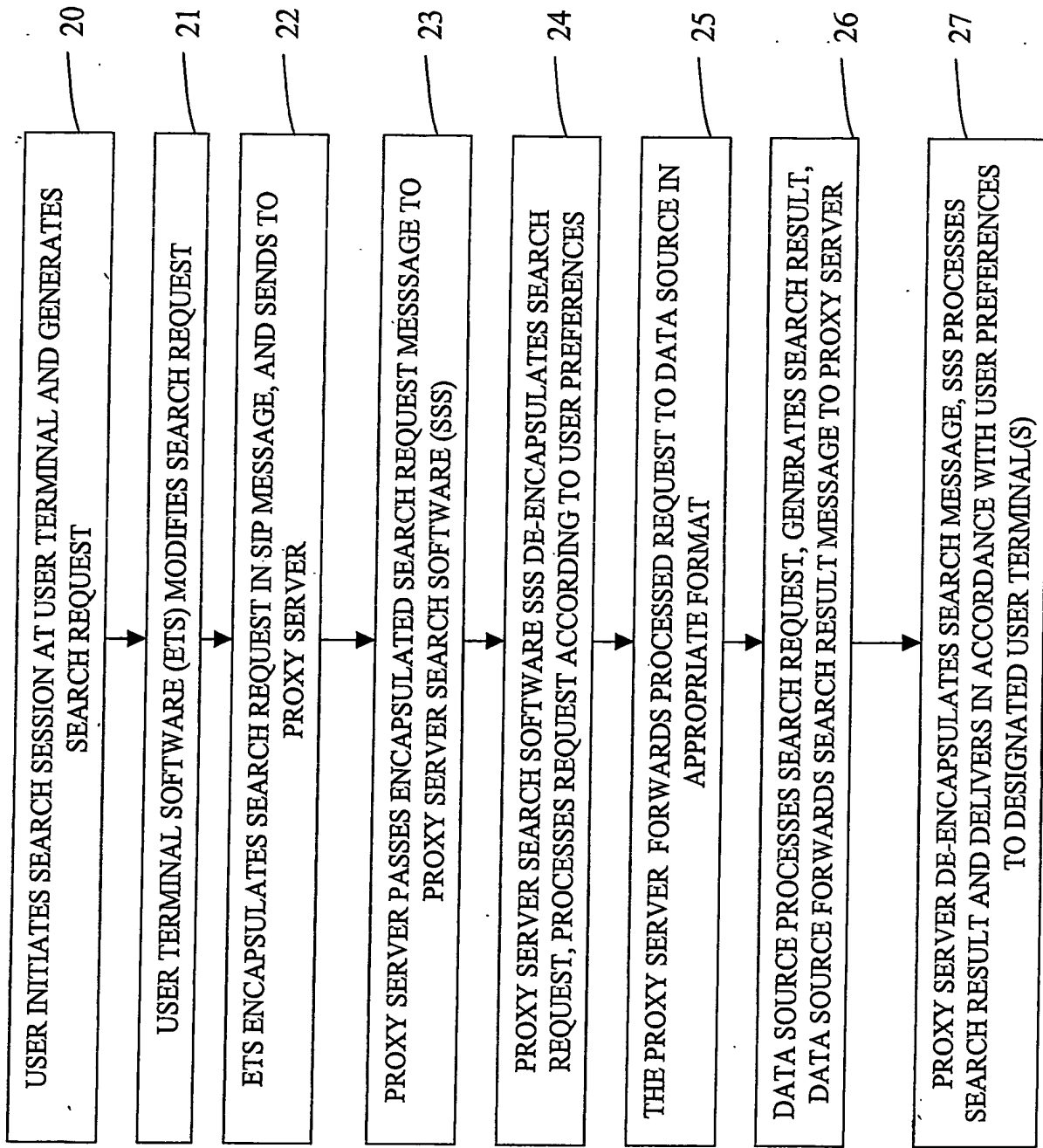ETS sends to proxy server | 37
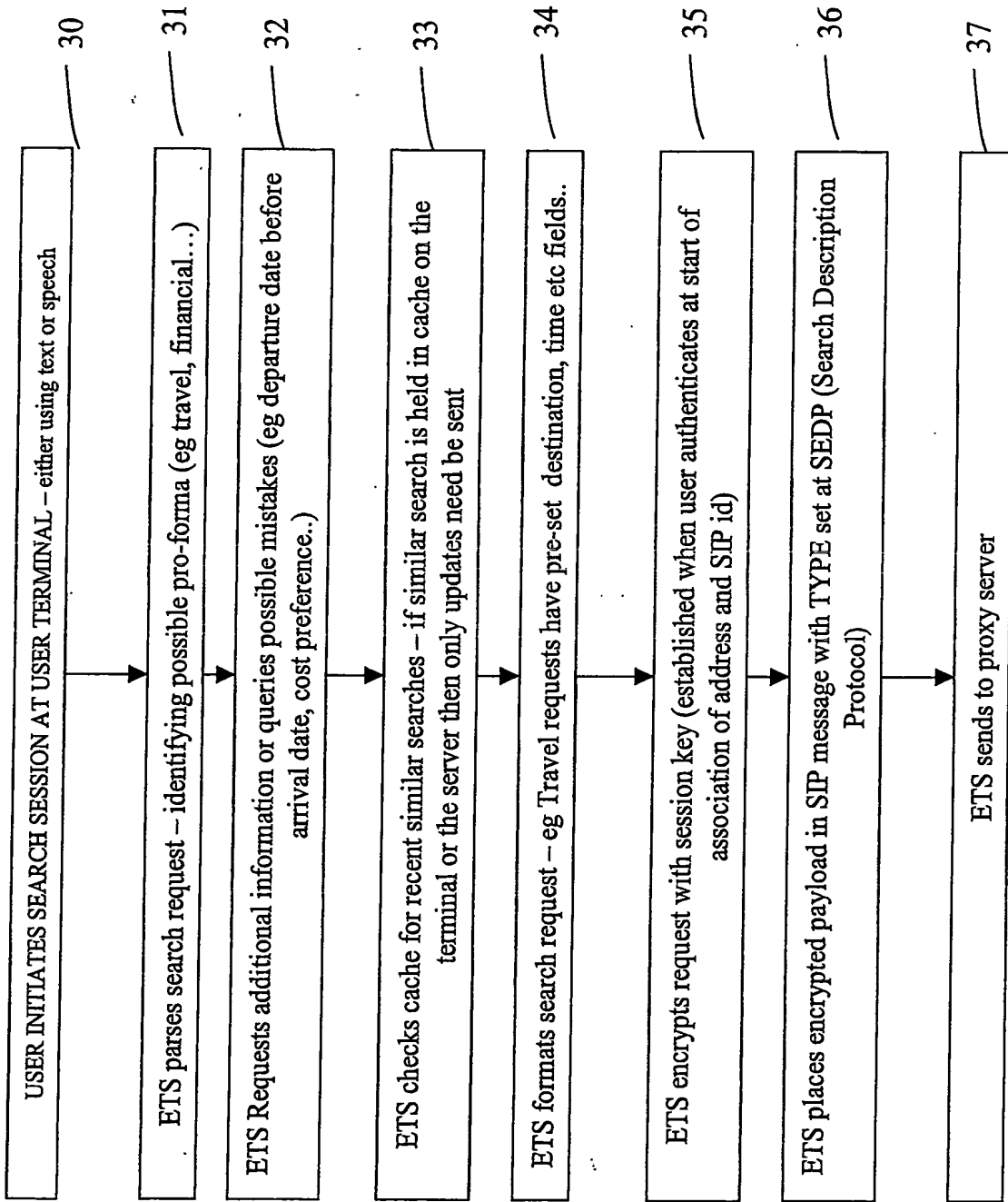
Figure 3

```
INVITE sip:search@bt.co.uk SIP/2.0
Via: SIP/2.0/UDP spain.tel:5060
From: joe.bloggs     <sip:joe   @atelco.net>
To: Search <sip:   Sea@uk.net>
Call-ID: 1000001@atelco    .net
CSeq: 1 INVITE
Subject: Urgent search
Contact: Joe Bloggs    <sip:joe   @atelco    .net>
Content-Type: application/SEDP
Content-Length: 160
```

```
Type = Travel.air
F=Luton;13,4,04; d=Ulan Botar; 28,4,04;;;
AP=british A, NOT Aeroflot, other
P=price
U=instant; update (phone1);
T=urgent
OS= Hotel, Car Hire, Insurance
sid 6784^^*jjkkj84
= =
```

**SIP
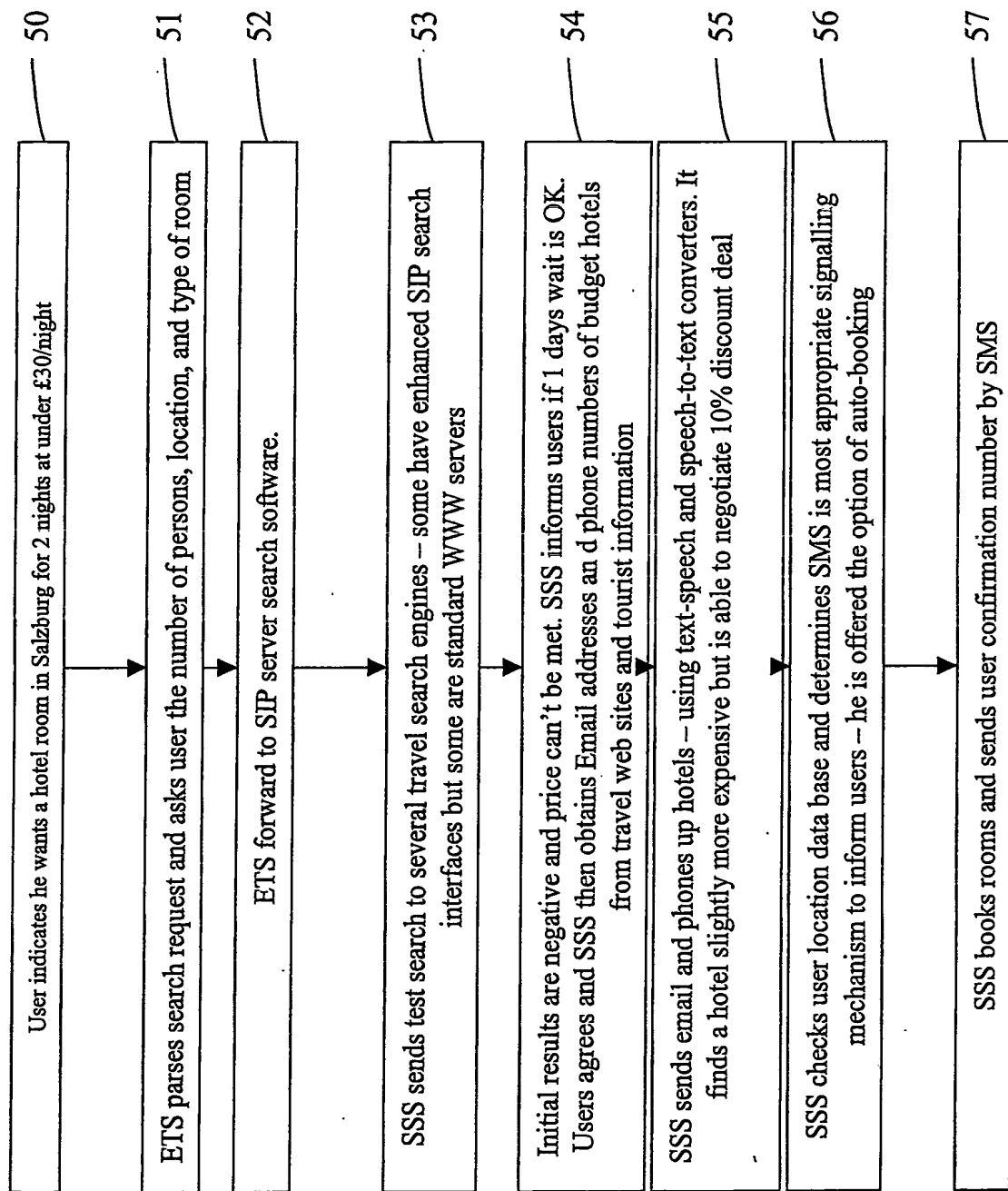header**

**SEDP
Search
description**

Figure 4

50 — User indicates he wants a hotel room in Salzburg for 2 nights at under £30/night

51 — ETS parses search request and asks user the number of persons, location, and type of room

52 — ETS forward to SIP server search software.

53 — SSS sends test search to several travel search engines – some have enhanced SIP search interfaces but some are standard WWW servers

54 — Initial results are negative and price can't be met. SSS informs users if 1 days wait is OK. Users agrees and SSS then obtains Email addresses an d phone numbers of budget hotels from travel web sites and tourist information

55 — SSS sends email and phones up hotels – using text-speech and speech-to-text converters. It finds a hotel slightly more expensive but is able to negotiate 10% discount deal

56 — SSS checks user location data base and determines SMS is most appropriate signalling mechanism to inform users – he is offered the option of auto-booking

57 — SSS books rooms and sends user confirmation number by SMS

Figure 5

PURCHASING SCHEME

This invention relates to a purchasing scheme which enables a user to purchase an item over a communications system. The purchasing scheme enables a user to purchase an item which is returned as a search result generated in accordance with the search system described in the inventor's patent application "SEARCH SYSTEM AND METHOD" co-filed with this patent application, a copy of which is filed herewith whose contents are hereby incorporated by reference.

Currently, when a person performs a search using a conventional search engine, the search engine is not able to provide additional information on the user which may affect the cost of an item which the person is searching for. A typical example, is if a user wished to search for car insurance. The user must enter with the search any membership information regarding bodies such as who the person's employer is or if they are a member of an automobile club or association if they want to receive information which reflects the discounts which may be available. Further, if a person simply wishes to purchase an item which is below a specified price, the person has to review the search results and manually enter their details with the appropriate site if such a service is offered on line (or if not contact the prospective vendor in some appropriate manner (for example, either call, fax, email or write a letter to them) and provide their financial and address details before the item (which may be a service) can be purchased.

Moreover, there are no incentive schemes for online purchasers in the same manner in which chain stores are currently able to offer incentive schemes to their customers.

The invention seeks to mitigate and/or obviate the disadvantageous in the prior art by providing a purchase system which uses a search system to locate an item by providing additional information on the purchaser by including user preferences information in the search request. .

Advantageously, one aspect of the invention is able to automatically provide additional information on the user which enables a user to purchase an item identified by the

search system at a cost which is modified by a proxy server mediating between the user
and a search server.

Advantageously, the invention uses a protocol which enables a user to be associated
with a permanent identity which may be associated with a static or dynamic address, for
example, a session initiation protocol (SIP) identity. This enables the user to retrieve
data from a distributed computer system to enable a search result to be sent to the user
even if the initial search session has terminated. The invention also enables a user to
purchase an item even if the user is not in communication with the SIP proxy server at
the time the item is purchased.

This invention relates to an automatic purchase scheme which uses the search system
and method of searching described in the inventor's copending patent application
"SEARCH SYSTEM AND METHOD" which allows data to be searched for and retrieved
over a distributed computer system. The search system and method use a protocol
which enables a user to be associated with a permanent identity which can be mapped
to an address (which may be either static or dynamic). In particularly, but not
exclusively, the search system and method uses a permanent identity such as a Session
Initiation Protocol (SIP) User Resource Identifier (URI), to retrieve data from a distributed
computer system to enable a search result to be sent to the user even if the initial search
session has terminated.

Search systems for retrieving data (i.e., information) from distributed computer systems
such as the Internet are known to have certain limitations. Internet search sites, for
example Google™, are configured to return results within a time limit which appears
almost instantaneous to the user of the search site.

Consider the case where a person enters a highly complex search request on such a
search site, for example, a search request involving perhaps a complex string of key
words and Boolean operators. If the search request is sufficiently complex then
conventional search sites would not be able to return any results complying with the
search query criteria in the short period of time which is usually set for determining and
displaying the search results.

A search entered on a conventional search site usually has to generate at least one search result within a specific period of time or the search site will display a negative search result to the user of the search engine. There is no mechanism to accommodate complex searches or to provide a search storage facility so that a user may in fact "log-off" the search site and retrieve their search results at a later point in time. The users of such search sites are effectively limited to the length of session that they can have with the search "server".

Other limitations include the user of a search site being unable to select where the search results are sent or how the search results are to be formatted and presented. For example, a user may enter a search request on a personal computer type terminal having a conventional display attached. However, the user may not want the results until a few hours have passed so that complex information can be retrieved and they may want the results to be displayed on their mobile phone.

Another limitation is that only restricted preferences are currently stored for users normally on the user's terminal or on the search "server". For example, preferences stored on the user's terminal can be provided by Internet Explorer 6 (IE6) predictive typing, stored lists past sites or content filters. Yahoo portal customisation is an example of the latter. However if one were to search for Manchester City and want information on the city itself and not the football club of the same name, it would be impossible to record a negative preference such as "AND NOT football" which would be retained for parsing future search results.

Another limitation is that current search methods do not support providing results in a variety of different formats. For example, current search methods do not enable a search engine to send an Email, phone a hotel and fill in a web form automatically. This is because search methods known in the art do not have the deeper understanding of the search preferences which would be required to implement such a sophisticated search method, as known search methods have no mechanism for understanding the context of the search, for example, – where the user is, the time, the preferences, etc, nor do current search methods offer a permanent state storage.

The present invention seeks to mitigate and/or obviate the above limitations known in the art by providing a search system and method which supports complex search queries being entered and which modifies searches according to user preferences. User preferences are also used to perform supplementary searches to obtain more detailed information and to designate end terminals where search results are to be sent.

Summary Statements of the Invention and Advantages

A first aspect of the invention seeks to provide a method of purchasing an item, the method enabling a user to search for information on the cost of an item on a distributed computer system, the method comprising: generating a search request for the item at a user terminal; modifying the search request to indicate at least one user preference; forwarding the search request to a server adapted to retrieve data from the distributed computer system, the server adapted to provide a search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

A user preference may include financial information personal to the user and at least one criteria which a search result must conform which initiates the automatic purchase of the item prior to the user being informed of the search result.

The search result may be provided in a medium and format selected by the user for a user terminal to which the search result is to be forwarded.

The user terminal may be selected according to the extent to which the search result conforms with the search request.

A second aspect of the invention seeks to provide a method of searching for data to be retrieved from a distributed computer system, the data including an item and associated cost information, the distributed computer system comprising at least one user terminal capable of communicating with a proxy server, the proxy server being capable of communicating with at least one other server capable of retrieving information from the

distributed computer system, the user terminal being adapted to be operable by a user who is registered with the proxy server with a unique permanent user identity associated with one or more static or dynamic addresses, the user identity being associated with a set of user preferences, the method comprising the steps of: generating a search request at one of said at least one user terminals, the search request indicating at least one search criterion to be met by the data to be retrieved; sending a search request message encapsulating the search request to the proxy server; associating the search request message with a unique search number associated with the user's unique identity; forwarding the search request message to at least one search server arranged to process the received search request message; performing a search according to the encapsulated search request; sending a search result encapsulated in a search result message to the proxy server; de-encapsulating the search result message; processing the search result according to the set of user preferences; selecting one of said at least one user terminals according to the set of user preferences; and sending an search result message encapsulating the processed search result to said at least one selected user terminal.

The method according to the second aspect may further include the step of the proxy server purchasing the item at the cost indicated by the search result and modifying the search result to indicate the item has been already purchased, if at least one predetermined user preference indicates personal financial information of the user which enables the purchase transaction to be completed by the proxy server, the proxy server being configured to automatically purchase an item at a designated cost if at least one user preference indicates that an automatic purchase can occur if the search result meets at least one predetermined search criterion.

The distributed computer system may support the session initiation protocol (SIP), and wherein the user terminal is a SIP registered terminal, the proxy server is a SIP proxy server, and the user is registered at the proxy server with a unique SIP address.

The search result message may be a SIP message which is sent to the user at an address determined by the SIP proxy server to be the current location of the user who requested the search.

The search result SIP message may be sent to a plurality of addresses associated with the user's registered SIP identity.

The search result SIP message may be sent to an address associated with a different user terminal than the user terminal operated by the user to send the search request to the SIP proxy server.

The user terminal may be a mobile device.

The set of user preferences may comprise a formatting user preference which indicates how the search result should be formatted.

The set of user preferences may comprise a plurality of formatting user preferences, each formatting user preference being associated with a type of user terminal.

The method of the first or second aspects may further comprise the step of the proxy server modifying the set of at least one search criterion according to said set of user preferences.

At least one user preference may indicate a scheme to which the user has subscribed which may modify the cost of an item returned by the search.

The method according to the first or second aspects may further comprise the step of the proxy server modifying the search result according to a set of user preferences.

The proxy server software may modify the search result by modifying the cost of an item returned according to a pricing scheme to which the user has subscribed.

The proxy server software may modify the search result by modifying the cost of an item returned according to a pricing scheme provided by the proxy server software.

The at least one search server to which said search request message is forwarded to by the proxy server may be determined by the proxy server in accordance with said set of at least one user preferences.

The proxy server may modify the search result received to identify an address to which the search request can be forwarded to in the form of an electronic message. For example, an electronic message such as an electronic mail message, a small message service (SMS) message, or a multi-media mobile message, etc.

The proxy server may process the returned search result to remove at least one result which is indicated by at least one user preference as not relevant to the user's listed interests.

The proxy server may process the returned search result to modify any returned cost value for an item indicated by the search according to a discount scheme to which the identity of the user is associated.

The proxy server may process the search result to prioritise the delivery of at least one item listed by the search result to the user in accordance with the extent to which said at least one item conforms with the set of at least one search criterion.

The proxy server may alert the user to a search result by encapsulating the search result in a small message service SMS message which is sent to the user over a communications network.

The search request may be generated by the user terminal modifying a previously stored search request in accordance with an updated set of at least one search criterion.

The set of at least one user preference may specify a maximum time limit for the search results to be generated.

The distributed computer system may be connected over a communications network. For example, a communications network which includes the internet, a PSTN, and which is capable of wireless and/or wireless connections with end terminals.

The session during which software provided on the user terminal interfaces with software provided on the proxy server to send the proxy server the search request

message may be terminated when the proxy server sends the search result message to the user.

A third aspect of the invention seeks to provide a user terminal arranged to be operable by a user for use in generating a search request according to a method aspect of the invention.

A fourth aspect of the invention seeks to provide a proxy server arranged to receive a search request message from a user terminal according to the third aspect, the proxy server being arranged to be used in a method aspect of the invention.

A fifth aspect of the invention seeks to provide a suite of computer programs arranged to implement one or more steps in a method aspect of the invention, the suite of computers being provided on the distributed computer system.   The computer programs may be implemented in software and/or hardware.

A sixth aspect of the invention seeks to provide a signal carrying a search request generated by a method aspect of the invention over a communications network comprising the distributed computer system.

A seventh aspect of the invention seeks to provide a signal carrying a search result generated by a method aspect of the invention over a communications network comprising the distributed computer system.

An eighth aspect of the invention seeks to provide a communications network arranged to communicate a signal aspect of the invention.

A ninth aspect of the invention seeks to provide a method of providing an item at a discounted cost to a user over a communication network comprising a distributed computer system, the method comprising performing a search for the item and associated cost information according to any one of claims 1 to 6, wherein the proxy server automatically provides the server software at a site indicated in the search result as able to provide the item requested by the search request with information derived from the user's preferences, the information including: sufficient financial information to

enable the user to purchase the item; sufficient address information to enable the item to be sent to an address designated by the user.

An item to be purchased may be automatically provided with a postal address by the SIP server using user preference information which provides personal information on the user's address. This enables the item purchased to be sent to a postal address.

A ninth aspect of the invention seeks to provide a discount purchase scheme in which a user is provided with an item using a method aspect of the invention, the method further comprising discounting the cost of the item returned by the search by a predetermined amount in accordance with a discount rule determined by the proxy server.

When an item is purchased a user preference may be updated to reflect a predetermined number of points which can be indicated by the user in at least one future search request for an item and associated cost information.

The points indicated by the user preference may generate a discount in the cost of an item indicated by a search result which at least partially conforms with the future search request.

A tenth aspect of the invention seeks to provide a method enabling a user to search for information on the cost of an item on a distributed computer system, the distributed computer system including an end terminal of the user, a proxy server, and at least one information source, the method comprising: generating a search request for the item at the user terminal; modifying the search request to indicate at least one user preference; forwarding the search request from the proxy server, the proxy server being adapted to retrieve data from one or more of said data sources, the proxy server being adapted to process a search result received from a data source and provide additional information to further interrogate a data source identified by said search result to receive a second search result, the proxy server being adapted to provide the second search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

The SIP search software may optimise the purchase of complex items requested by prompting the user for additional parameters which relate to the purchase.

A user may enter a search request and the SIP server modifies the terms in the search request to optimise the purchase price of an item.

The SIP server may provide a notification of the results to a user end terminal and the user increases the bandwidth available to receive a search result following said notification. This enables a user to move into a higher bandwidth environment, such as a hotspot for WI-FI in a wireless lan environment.

Advantageously, a search result could be forwarded by the proxy server to a data source by the proxy server sending an electronic mail message to an electronic mailing list associated with the search result, or by filling out a web page (e.g. for insurance quote) automatically. The data source may not be accessible via another server but could be accessible via instead an IP-PSTN gateway, for example, if the proxy server uses automatic speech generation and recognition technology to phone up a hotel and actually request a price using some conversion means to convert the text version of the search request into a spoken version. The data source may comprises a server and an associated search engine. Advantageously, the invention enables the user to terminate the session with the search server prior to the search results being generated, which enables more complex search requests to be processed.

Advantageously, the invention enables the user to receive search results more rapidly if the result is sufficiently conforming with the user preferences to be determined as a high priority. In this way, the user is provided with more relevant results faster.

Preferably, the user identity is associated with one or more static and/or dynamic addresses. Examples of static/dynamic addresses include – an E164 address (please explain what this is/means), an IP address, a telephone number for a facsimile, a pager number.

Examples of a data source include any source of information which is available via the distributed computer system. The data source is preferably running the special search software (module #3) for greater functionality and better optimisation. In alternative embodiments the data source may comprise a web page.

The search result message may encapsulate the processed search result. Alternatively, the search result message may provide a key to enable a user retrieve the processed search result. For example, an SMS could be sent to alert a user of a particular search result having being obtained and provide the user with a key (e.g. a code or encrypted message) which enables the user to retrieve video from a store. It is envisaged that such "alerts" will be very useful where a search result indicates a file has been located as it would enable the user to connect to the proxy server using a suitable bandwidth connection.

Advantageously, the invention supports SMS messaging to alert users to search results and providing a user with a key to enable the user to retrieve a file via a high bandwidth connection such as a WLAN. For example, if a video clip was located, a user might wish to access this from a WLAN because the file is too big to view/download over a dial-up bandwidth connection.

Advantageously, the invention enables the search process to be performed more efficiently by including additional information provided by the user preferences in the search request and/or using additional information provided by the user preferences to remove less relevant search results which are returned to the enhanced SIP server prior to these results being forwarded to the user. The invention thus enhances the RFC (please defined this) functionality of the server software over the normal search software which a server may have.

Advantageously, the search can be forwarded to the most appropriate user end terminal for the content of the search result.

Advantageously, the search can be forwarded to the user end terminal which the user is operating at the time the search result is forwarded. The SIP proxy server is able to store results which are received when an appropriate user end terminal cannot be

identified as one which is being operated by the user. The SIP proxy server may then modify at least one search result or generate another form of notification to alert the user to the search result and to indicate to the user how the user may retrieve the search result.

Another aspect of the invention seeks to provide a proxy server which is arranged to receive a search request message from a user end terminal aspect of the invention, the proxy server being arranged to be used in a method aspect of the invention.

The preferred features of the invention as set out by accompanying the dependent claims may be combined with any of the aspects of the invention as set out by the independent claims in any manner which is apparent to those skilled in the art.

Specific embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 shows schematically a SIP-supported data retrieval system according to an embodiment of the invention;

Figure 2 is a flowchart showing schematically steps in a method of searching for data according to an embodiment of the invention;

Figure 3 shows steps which occur at an end user end terminal in a method of method of searching for data to be retrieved from a distributed computer system according to an embodiment of the invention;

Figure 4 shows schematically an example of the fields in a SIP header and Search Description Protocol according to the embodiment shown in Figure 3;

Figure 5 shows schematically an embodiment of automatically completing a transaction to secure an item returned by the search result according to another embodiment the invention; and

Figure 6 which shows schematically steps in another embodiment of the invention in which a user is prompted for more information to improve the search process and enable the search results to indicate a price for the item to be purchased.

The best mode of the invention as currently contemplated by the inventor will now be described by means of specific embodiments of the invention. The best mode of the invention as currently contemplated by the inventors is supported by the session initiation protocol (SIP). SIP is the Internet Engineering Task Force's IETF's standard for multimedia conferencing over IP. SIP is an ASCII-based application-layer control protocol and is defined in RFC 2543, a copy of which is filed herewith and the contents of which are incorporated by reference.

SIP can be used to establish, maintain and terminate calls/sessions between two or more end-points. More specifically, SIP provides session management within a packet telephony network which provides the ability to control the attributes of an end to end call as well as signalling which enables call information to be carried across network boundaries. Thus SIP provides the ability to: locate the endpoints via address resolution, name mapping and call redirection; determine the media capability of an end point; determine the availability of an end point; establish a session; handle the transfer and termination of a call; and have an identity associated with one or more address mappings, as is well known in the art and defined by RFC 2543.

Those skilled in the art will recognise that although the invention is described in the context of the SIP protocol as described in RFC 2543, the invention is not limited to the SIP protocol per se but extends to any protocols derived from the SIP protocol which support the SIP functionality used by the invention. For example, the invention can be implemented by any protocol which enables a proxy server to: locate the endpoints via address resolution, name mapping and call redirection; determine the media capability of an end point; determine the availability of an end point; establish a session; handle the transfer and termination of a call; and map an identity to a number of static and/or dynamic addresses, providing the protocol also enables a search session to be given a unique search identity by proxy server search software, and providing the search is been initiated by a user registered with the proxy server and assigned unique user identity having the above properties, and providing the proxy server is able to associate

the user identity with one or more user preferences. These features of the protocol are necessary to enable the proxy server to modify and/or filter the search query as appropriate and to select a user end terminal to forward the results to in an appropriate format.

Referring now to Figure 1 of the accompanying drawings, a distributed computer system over which data can be retrieved using a search method according to the invention is shown. In Figure 1, a SIP-supported data searching system for retrieving data using a distributed computer system according to an embodiment of the invention is shown. The SIP-supported data retrieval system comprises a plurality of devices supported by appropriate software modules enabling the devices to interface with each other over the distributed computer system.

The distributed computer system shown in Figure 1 comprises a communications network which includes at least one user operable end terminal 10, a SIP proxy server 12 and at least one data source 14. The end terminal 10 may comprise any type of device capable of relaying information to the SIP proxy server 12 in the form of a search request. As shown in Figure 1, for example, a personal computer 10a or a mobile phone type device 10b capable of connecting over the communications network to the SIP proxy server 12, which may its self comprise a plurality of components, for example, a central server 12a and a data storage facility 12b, which may for example provide a database of user preferences and/or past search results, or search results which have yet to be communicated to and/or retrieved by a user who has submitted a search request. In certain embodiments of the invention, the SIP proxy server 14 may itself comprise a distributed computer system, for example, the proxy server may retrieve the user preferences from a separate data base storage system via a communications network.

Those skilled in the art will realise that a variety of forms of connection (wireline, wireless, dial-up, broadband ASDL etc, LAN etc connections) are possible and that the end terminal 10 could be a portable device. As the connection need not be permanent an end terminal 10 which sends a search request to the SIP server 12 does not need to remain connected to the SIP server 12 after the search has been sent to the SIP server

12. The invention enables an appropriate end terminal 10 to be located for forwarding a search result to, according to one or more user preferences established by the user and/or by the end terminal software and/or proxy server software. A user end terminal 10, the SIP proxy server 12 and a data source 14 interface with each other either directly or indirectly as appropriate according to specific embodiments of the invention, for example, search results returned by a data source 14 may be sent (if a user preference/search request permits it) directly to an end terminal 10 in one embodiment of the invention.

Referring now more specifically to Figure 1, two end terminals 10a, 10b shown by way of example comprise a personal computer-type 10a and a mobile telephone type device ,10b. End terminals 10a,10b are each capable of being connected independently to other elements in the computer system, i.e., to a the SIP proxy server 12 and to at least one data source 14. It will be appreciated by those skilled in the art that the data source 14 from which or via which information is retrieved does not need to be limited to the specific examples 14a,14b,14c shown in Figure 1. In Figure 1, data source 14a comprises a web server, data source 14b comprises a search engine (or database), and data source 14c comprises a phone terminal.

A plurality of software modules #1, #2 and optionally #3 are provided, components of which may be localised on an individual device or may be distributed across one or more devices. Software module #1 comprises end terminal software (ETS) which runs on the user end terminal 10a and interfaces via SIP user agents with software module # 2 which comprises SIP server software (SSS) run by the SIP proxy server 12.

Software module # 3 is provided optionally at the data source 14. The data source 14 may comprise, for example, a conventional search server or even a phone type device such as 14c in Figure 1, which may not be provided with software module # 3. For example, consider where the proxy server 14 is querying a conventional search engine such as Google™, and where no new software is provided (i.e., if software module #3 is not present on the device queried), for example, the web server 14a in Figure 1.

Although Google™ can be queried in a conventional way, Google may later provide an API (Application Program Interface) which could enable more complex, enhanced or

more efficient SIP searches to take place.   Alternatively, the proxy server 14 could have
processes a returned search result to determine that a specific web-site should be
resent the search request formatted in a specific way, for example a travel web-site for
checking or booking flights. Such a web-site may operate in a SIP-enabled or non-SIP
enabled manner. As an example, in Figure 3, software module # 3 comprises search
database/engine software SDB which runs on the search server (equivalently known as
the search engine) 14b.

The term end terminal 10 as used herein refers to any device suitable for generating a
search request and/or receiving a search result. The user end terminal 10 can comprise
a personal computer type device 10a as shown in Figure 1, however, those skilled in the .
art will appreciate that the user end terminal 10 may comprise any device capable of
remotely accessing the search engine and/or displaying search results, for example, a
personal digital assistant type device such as the PalmPilot™, or a mobile telephone
type device 10b such as is shown in Figure 1, which a user can operate.   The end
terminal 10 to which the search result is sent may not be the same end terminal 10
which generated the request.

In one embodiment of the invention, the end terminal 10 which receives the search result
is not capable of generating a search request, but is capable of displaying a search
result (for example, the user end terminal 10b may comprise a mobile phone type device
which does not have sufficient memory capacity to support the generation of a search
request, but which can receive a search result in the form of an small message service
(SMS) text message).

A user of an end terminal 10 is assumed to have set up a SIP identity URI, in the
manner described in RFC 2543 for example, and requests a search by entering an
appropriate search query into an appropriate search application. The search application
can provide any appropriate interface for the user to enter search terms, and it will be
appreciated by those skilled in the art, that whilst a computer type terminal such as is
shown in Figure 1 would support a sophisticated Graphical User Interface, if a search
were to be requested by a less sophisticated device, the user interface can be much
simpler.

Figure 2 shows steps in a method of searching for data to be retrieved from a distributed computer system according to the invention.

In Figure 2, in step 20, a user initiates a SIP search session at an end terminal 10 and generates a search request which will include information on the user's SIP identity. The user's SIP identity could be entered either manually by the user as part of the search request but in the best mode of the invention is generated automatically as a result of the user initiating the SIP search session.

The search request comprises at least one search criterion and is generated using an appropriate search software application adapted to interface with the ETS (end terminal search software module #1). When the search is requested by the user, the search software application passes the search request to the ETS. The ETS software module then modifies the search request according to at least one user preference in step 21.

A user preference used to modify the search result at the end terminal 10 may have been determined in a variety of ways. For example, the user preference may have been either predetermined by the user who has entered a personal profile comprising a set of one or more user preferences (for example, no interest in football or strong interest in Bath as a town/place but not as a bathroom item). The ETS software module will have associated such a user preference set with the user's SIP identity. The user preferences may be supplemented or replaced by one or more user preferences which the ETS software module has determined automatically from analysis of the user's historical search activities, i.e., by analysing which search results indicating a web-site resulted in the user visiting the web-site.

The ETS then encapsulates the search request within a SIP message in step 22 of Figure 2 using a search description protocol (SEDP) according to the invention, and sends this to the proxy server.

The proxy server then passes the encapsulated search message to the proxy server software module SSS in step 23 of Figure 2, and the SSS then de-encapsulates the search request to process the request further according to the user preferences in step 24. The further processing of the search request may be based on additional user

preferences which the proxy server has determined, for example, that results from a particular data source have historically resulted in the user being more likely to access the web-sites indicated in the search result, and the proxy server may then generate a user preference for that data source to be accessed again.

Alternatively, the proxy server may have a central scheme for discounting any price which is returned in a search result from particular types of web-sites according to a scheme which the user has subscribed to. The amount of discount may be fixed or vary according to certain conditions. The fact that discounts should be obtained and/or the details of organisations which the user is a member of could be provided as user preferences which are used to modify the search request.

The user preferences which the proxy server has noted may also vary and not be fixed, for example, according to the time the search is generated and according to the priority of the search. For example, the proxy server may note the search is urgent and so will always notify the user immediately a result is received, even if the user preferences forwarded by the ETS indicate a user preference for not notifying immediately). Thus one or more proxy server user preferences may in some embodiments of the invention, override one or more end terminal user preferences.

The proxy server then processes the search result and forwards it to a data source in the appropriate format in step 25, for example, either as an email or a normal search request to a non-SIP enabled search server such as 12a shown in Figure 1, or even convert the search request to a suitable query and connect to a telephone data source 14c such as Figure 1 shows.

The data source 14 then processes the search request to generate a search result which is conveyed as a search result message to the proxy server 12 in step 26. Depending on the type of data source, the search result may comprise a audio file, for example, if the data source is 14c, the person answering the query may have their answer recorded as a voice-memo and stored in an audio format. The answer may however, be converted at some suitable point using speech to text technology to a text file, and the search result would then have a more conventional format.

The user may have set up a preference to convey an indication with the search request that search results should be sent directly to the user's end terminal in some embodiments of the invention. For example, if the request is very urgent or if the user has a preference set up that results returned in email format should be forwarded directly to the user's mail server and not returned for further processing by the proxy server. This direct return of the search results option is not indicated in Figure 2, as in general the search results will be processed by the SIP server to determine an appropriate location for the results to be stored and/or sent to an end terminal.

The proxy server 12 de-encapsulates the search message it containing the search result then processes the search results received, and generates a search result having a format compliant with the user preferences and/or with the end terminal to which the proxy server has determined the results should be sent to in step 27.   -

Unlike a conventional search request, which may simply return a website where a user must then re-enter additional information if the user generates a search request for "cheap flights to Egypt", the SIP proxy server 12 is able to process the search result to enable further interrogation of a data source to determine more relevant search details. This further interrogation may be enabled either by the initial processing performed in step 24 of Figure 2, or as part of an iteration of the search process steps 24 to 26 performed within the processing performed in step 27 in Figure 2, prior to delivering this to the user end terminal.

As an example, if data source 14a returned a URL for a web-site for a travel company that has an on-line booking system, the SIP proxy server may already be aware of the format the on-line booking system would require to find out specific details of flights and would then provide information to enable the booking system form to be effectively filled in. Alternatively, the SIP server may interrogate the booking system to determine the information required. Once the SIP server has obtained a specific result which conforms with the user's search request to the level required (i.e., specific flight information has been obtained), the SIP server forwards this information as a search result to the user. If the SIP server is aware that the user has frequent flyer miles or is a participant in another discount scheme (either as an individual, or if some organisation the user is a member (and which is recorded in his user preferences) has a discount scheme), this

information might also be submitted by the SIP server, so that the user is also given information on the price of a flight which takes his frequent flyer miles into account. In this way, the search results returned by the SIP server are much more relevant to the user. In a similar manner, car insurance sites, theatre ticket sites, etc., and all be further interrogated to get specific information relevant to the user's initial search enquiry.

The method of encapsulating the search within a SIP message is performed using any suitable search description protocol (SEDP) which can be devised to provide a structure to the search request generated by the user at the end terminal 10. For example, in one embodiment of the invention, the SEDP provides a structured search request format which includes fields to indicate a set of search characteristics. The search characteristics provided indicate the type of search and a range of at least one search criterion, and may optionally include one or more user preferences. The one or more user preferences can be generated by the end terminal SIP software module #1 or by the proxy server software.

Figure 4 shows an example of a SEDP, and is described in more detail later on, but in general a an search description protocol according to the invention will support one or more of the following characteristics:

Security (encryption);

User SIP id;

a variety of search descriptions fields (eg XML/free text/keyword selection);

information on current session context (what user has been doing eg Email, how long connected, how long on current IP address,.....); and

information on cached recent searches on terminal (eg large files might be held on the terminal and should not be sent again).

Those skilled in the art will appreciate that Figure 4 shows only some features of a search description protocol SEDP according to the invention and another protocol which is able to encapsulate the search request within the SIP message could be implemented instead. The essential feature is that any search description protocol needs convey at least the search request information and the user's SIP identity universal resource indicator (URI). In one embodiment of the invention, the ETS may be configured to format the search string the user has entered so that this conforms with a more efficient

search expression. In another embodiment of the invention, the ETS may cache one or more previous searches. This enables the ETS to add updated information to a cached search to facilitate the search request process.

Returning to Figure 1, a user terminal generates a search request which is encapsulated by the end terminal SIP software. The encapsulated SIP message is then transmitted from the user end terminal to a SIP proxy server 12 with which the user has registered the user end terminal as a SIP terminal 10. The SIP proxy server 12 may have several registered user end terminals which the SIP proxy server is able to determine are associated with a particular user SIP identity.

When the SIP proxy server 12 receives the encapsulated SIP message, the server forwards the encapsulated message to the SIP proxy server software module #2 SSS. The SSS software module then processes the received message to de-encapsulate it. The SSS software module then analyses the search request in accordance with a predetermined set of search rules which are configured by the SSS and which may be determined at least in part by at least one user preference which the SSS is able to associate with the user's SIP identity URI.

In one embodiment, the SSS software module may further modify the search expression and/or select specific servers within the distributed computer system to forward the search expression to according to the user preferences associated with the user's SIP identity URI.

The search is modified in accordance with any specific user preferences. The user preferences which are used to modify the search may be a subset of the total user preferences which are available, and the SIP proxy server 12 may select the user preferences to be used to modify the search by analysing the search request and determining which user preferences are appropriate to the search. For example, the SIP proxy server 12 may select a user preference to indicate search results should be sent to home if they relate to a leisure activity and to work if they relate say to financial items, so that the user preference for which end terminal results should be sent to is selected according to the type of content which the user has requested. By incorporating user preferences, the SIP proxy server software can perform certain additional steps to

ensure any personal preference information associated with the user's SIP identity is incorporated into the search request as a supplementary search expression, or use the users personal details to perform a supplementary search to obtain more relevant results, or even purchase an item located by a search.

For example, the SIP proxy server 12a may access database 12b to retrieve a set of at least one user preferences which are associated the user's SIP identity, such as the user's hobbies, the user's search preferences, the user's past search results, the user's past user actions after search results, and the user's most frequently accessed web pages. These user preferences are then used to reconfigure the search request. The user preference information could be used by the SIP server to add supplementary search expressions which include negative search criteria. For example, a user preference to indicate that unless expressly entered as a key word, no results should refer to a specific keyword should be included. In this way, a user can set a user preference for a keyword such as "Football" to not feature in any search results. The SIP server then can modify received search requests to automatically include in the search expression information equivalent to the boolean expression "AND NOT football". The modified search expression then results in search results being returned to the user which exclude football related information. This is advantageous as if the user's preferences indicate the user wishes to exclude search results for football related sites when a search is being performed over a communications information network such as the World Wide Web on the Internet, a search for "Manchester" for example, would not result in search results being forwarded to the user which referred to "Manchester city" or "Manchester United" or any other football related site which mentioned "Manchester".

The user's preferences may include search site preferences which would indicate one or more search sites are to be included (and/or excluded search sites) in the search, a maximum search time for the search to be active, and search result terminal and/or result formatting information.

The SIP server 12 then selects a number of search engine/server/sits in further SIP messages. The further SIP messages may be encapsulated or may not be according to whichever form is most suitable for the specific server being queried. For example, some messages could use a new protocol if a server was equipped with an appropriate

search interface – API) between the SSS and SDB. The protocol would need to have one or more (ideally all of the following features):

be secure (e.g. the protocol might use Ipsec);

provide authentication – for example, the protocol might require authentication of servers (to check for Fakes);

support compression (of the query and/or of the result); and

allow caching on the SIP proxy ideally (at a very high level, for example, if a highly popular football team scored a goal and the number of users who may search for a video clip of this to download could reach as high as 10 million, however, the SIP server would only need to retrieve this video clip once !).

More than one protocol could be utilised to transport the SIP messages, for example, if a SIP Proxy server needs to provide queries in a number of ways, for example, the server could send a normal email to a mailing list requesting more information on the search expression (or an expression derived from the search expression), or even (using a suitable automatic voice generation application) phone a hotel, or fill out a Web form (all of which forms of further querying use different transport protocols).

As an example, in a typical query message according to the invention, the following information could be provided:

Origin IP address:123.32.123.001

Origin URI :name.surnameofuser@atelco.com

Hash:4387t84gf8t4f84tg83rtf8p32yh239f8y[98fy9[8747643865gffgyfrjylegfgv,ueg yvjgvy

Search reference: 653467252

Search terminal type = Pentium III PC

Account type: Individual

Average internet access activity duration: 2 hours

Previous Activity: email

Location of terminal: Ipswich, England

Request type: TRAVEL

Request: Date 23/1/04;

From: Stansted;

To Moscow;

Time: unspec;

Cost CHEAPEST;

Return No

End ReqType

Return:: Instant(123.32.123.001), update (day, Mobile- name.surnameof user@atelco.com)

Cost – Bill 1

END

Each search is assigned a unique search number by the SIP proxy server 12 so that the SIP server 12 is able to match any replies to the original search request even if the user is not longer in communication with the SIP proxy server 12 via the user end terminal 10.

When the SIP message carrying the search request is received by a data source 14, typically an information source such as a search server 14b, the message contents are extracted and are processed by the appropriate SIP software module located on the other server, e.g. the search engine SDB software module #3 located on the search engine of a search server. Alternatively, if the SIP server chooses another transport protocol, the message contents may be processed in the normal way (eg Web form) for the site queried, for example, as would happen if a conventional search engine (i.e., non SIP enabled) were queried by the SIP proxy server 14. ,Also, if a SIP server 14 forwards the search request to a data source such as a mailing list or email address for a particular body or organisation of interest regarding the search request (whose addresses may have been located by earlier search requests by the user or provided by a preliminary search result generated by a conventional or SIP search engine), the data source will not be SIP enabled.

When a search request message is received by a data source 14 , if the data source 14 determines one or more results to the search criterion/criteria set by the user's search request, the data source will forward the search results in an appropriate manner to the SIP proxy server. Where a SIP server 14 has actually telephoned a number and announced the search using text-to-speech technology, the person who responds to the search may be given a number to contact and a password so that they can respond later to the query.   When the person dials the number, they may be presented with the option

of entering the code, and then be allowed to record a message. The message can then be associated with the SIP identity of the user and the search identity using the code entered. This then enables the message to be forwarded to the SIP server which might convert the audio file to a text file using speech-to-text technology, or forward the file to the user as a search result for the user to play on their machine. A similar process is undertaken where the SIP search message is forwarded to an email or mailing list address so that any response can be identified by the SIP proxy server with the user's SIP URI (or key to get information at a later point in time (see the description above).

When a SIP enabled search engine 14b encapsulates one or more results in a SIP message together with the unique search number and forwards this to the SIP server, this enables the SIP proxy server 12 to associate the search result with the SIP identity of the user who requested the search.

When the SIP proxy server 12 receives a SIP message it extracts the search result and search number. The SIP proxy server 12 associates the search result with the SIP identity of the user who requested the search. The SIP proxy server search software module # 2 SSS may store results for a specific search number according to the set of user preferences for a predetermined period of time or until a specific number of positive search results are received. Null search results can be forwarded by the SIP proxy server to the user and/or near matches provided in accordance with the user's preferences.

The SSS software module then determines the user's current location (as located in the SIP location database), the user's terminal type at that location and format (determined in accordance with the user preferences). For example, if the user does not wish to receive the search results until a certain time, or does not wish to be disturbed, if this information is recorded on the SIP database of SIP user preferences, then the SIP proxy server is able to process the search results appropriately and format the results for the appropriate terminal display.

The user may also specify more than one location for results to be sent to, for example, a short descriptive form (for example, just a town if the user has search for a company's location) may be sent to the user's mobile phone, which could alert the user to log into

their personal computer (to which the SIP proxy server software would have sent a SIP message which encapsulated the full address of the firm as a search result).

As SIP associates currently valid addresses with a SIP user ID, and uses these to deliver the search results there is not need for a user to retain an open search session with the search engine whilst the search is being performed. The search can use permanent SIP addresses which enables results to be collated and a user is therefore also able to specify if, for example, they wanted results to be returned collected into 10 "hits" until the search time has expired, after which any remaining searches should be sent to the user.

As the user is able to designate the terminal and format the search results are to be provided by, it will be appreciated by those skilled in the art that the search results could be provided in form which is accessible when the user next runs the search software module #1 search application, or alternatively be sent in the form of an electronic mail message (e-mail message) or short message service (SMS) message.

As the protocol user identity associated with the user, for example, the SIP URI name.surnameoftheuser@atelco.com, is permanent, this can be associated with a number of addresses/phone numbers which may be static or dynamic, for example, with telephone number such as 01234 123 456 or an address such as 111.223.123.011...)

Another aspect of the invention relates to a distributed search environment in which the SIP proxy server search software module #2 determines the capabilities/specialities of one or more search engines/servers within the distributed computer system. For example, this could be achieved by sending a request for information to the search engines/server, but other mechanisms which can be used include web crawling (for example, such as Google™ implements) or by being sent advertisements, or any other way in which it is possible for the proxy server to discover their capabilities/specialities. The search software running on these machines uses another protocol (Search Capability Protocol CCP) to describe their capabilities (for example, speed, data bases searched, the type of files searched (e.g. *.doc, or *. pdf file names), etc. to the SIP proxy-server 14. The SIP proxy server 14 is then able to determine which search

engine is most suitable for a user and/or a specific search requested by the user, for example, by considering the search request, user preferences.

Example 1.

A specific embodiment of the invention will now be described by way of example with reference to Figures 1 and 2 of the accompanying drawings.

Consider a user who wishes to locate information on trams. The user has a history of accessing many tram and transport related web-sites on the Internet, has transactions which record the purchase of model trams, and is listed on at least one transport enthusiast email list.

The SIP proxy server has recorded this information in association with the user's SIP identity and the user is assumed to have set their preferences to indicate that they are interested in transport. Accordingly, both the ETS software module and the SSS software module will record this information as if the user has used SIP for all of their sessions, including browsing, email and Instant messaging, all the information built up about the user's information sources and preferences will be accumulated in association with the user's SIP URI identifier—for example users.name@businessname.sip.

Repeated use by the user of the information retrieval search system according to the invention will result in the user having activated (for example by clicking on a highlighted URL returned with the search results) features which fall into the set (site type = museum, request = information,...etc) and this information will be stored on the SSS. Other data mining of the user's previous sessions can also be used to optimise the search to suit the user's preferences.

Consider the user has the specific request of wishing to restore an old tramcar and so the user enters the search phrase "tram, restoration, projects, buy" in step 20 of Figure 2. The user may naturally supplement these search terms with appropriate Boolean operators and wild card characters etc, however, a simple key word such is given here as an example with the implicit assumption the key words are separated by commas and link by an inherent "AND" so that all the key words must be present before the search results are returned.

The ETS software then parses the search request to indicate additional information which is accessible to the ETS software in step 21 of Figure 2, for example:

Search terminal type = Pentium III PC

Account type: Individual

Average internet access activity duration: 2 hours

Previous Activity: email

Location of terminal: Ipswich, England

...

This request is then packaged, using the Search Description Protocol, in a standard SIP message in the manner described in RFC 2543 and transmitted along a communications link to the SIP proxy server 12 in step 23 of Figure 2.

The SIP proxy server 12 then passes the (unopened, i.e., still encapsulated) message to the SSS in step 24 of Figure 2. The SSS is an "intelligent module" capable of making requests to a large number of databases and specific sites or search engines (some but not all of which may have SDB software modules). As an example, the SSS can send the request to one or more of a plurality of different information forums, for example:

i)   the SSS can send a request to a news group on trams in the form of a request for information which the SIP server automatically generates;

ii)   the SSS can send the request to a transport web-site that logs potential projects and restorers (and tries to match the two) which has SDB software which enables the two software modules to create a user entry (as the user might need screening from replies this might be to an email account: 876462965@atelco.com which is created just for this search entry alone, and which would therefore screen the user from spam email which might otherwise be generated if the user's normal email address was given);

iii)   the SSS can send the request to a standard search engine such as Google™ (www.google.com or www.google.co.uk) from which the SSS is able to request a specific number of results, for example, 1000 ·

responses. The SSS then filters the responses provided by the
conventional search engine to ensure that the search results conform with
the user preferences the SSS is aware of for the SIP user identity which
requested the search. The SSS can further interrogate the user if the
SSS detects that ambiguous results are being generated (for example, by
using a built in statistic/pattern matching program the user could be asked
"Do you mean you want to BUY a TRAM?"). The SSS can then
incorporate the user's response to such a further query to refine the   .
search terms the SSS uses to interrogate standard search engines;

iv)   the SSS can send the request via email to one or more other individuals
         or mailing lists who/which the SSS is able to determine have associated
         with trams as a subject matter of interest; and

v)   the SSS can send a request via email to a museum such as the national
         transport museum.

Example 2

Figure 3 shows in more detail steps in the process of generating search request at the
user's end terminal. In Figure 3, in step 30 a user initiates a search session at the user
terminal, for example, using either text or speech (and a suitable application to generate
text from the spoken search request). The ETS parses the search request to identity a ·
possible pro-forma it is aware of for that type of enquiry in step 31, for example, if the
search has a travel or financial aspect. This enables direct interrogation of web-sites
such as travel sites, and may remove additional processing of search requests/results by
the proxy server such as were described in the context of step 27 in Figure 2. If
additional information is needed, the ETS may request this of the user and if the ETS
detects a mistake, then it may query this with the user. In the context of a travel enquiry,
the ETS may provide the user with a generic form which requests departure dates, cost
preference etc, and if the departure date is before the arrival date detect this as a
mistake.

The ETS checks to see if previous searches have been performed in step 33. For
example, the user may have requested the same information a few days earlier, in which
case the generic form may be presented to the user with appropriate information already
completed, or the ETS may alternatively have cached some search results. If a similar

search has been recently performed and is held in cache on either the end terminal or on a server such as the proxy server 12, then only an update needs to be sent to the user.

The ETS then formats the search request in step 34, for example, the travel search request may have a pre-set "destination, time, departure point, time" field format.

The ETS then encrypts the search request with a session key in step 35, which was established when the user authenticates at the start of the association of the address of the end terminal and the SID id.

The ETS then places the encrypted payload in a SIP message with TYPE set at SEDP (the search description protocol) in step 36.

The ETS then sends the SIP message to the proxy server in step 37.

Figure 4 provides an example showing the format of a SIP header and SEDP search description according to an embodiment of the invention.

The SIP header includes at least the following information:

i)   INVITE sip:search@bt.co.uk SIP/2.0 – this indicates the SIP header relates to the invitation from the SIP server to a search engine

ii)   VIA: SIP/2.0/UDP spainltel:5060;

iii)   From: Joe Bloggs<sip:joe@atelco.net> - this is the SIP URI of the user;

iv)   To: Search <sip: search@uk.net> - this provides the SIP URI of the search service;

v)   Call-ID: 10000001@sipsteme.net – this is the call of the SIP session, which can terminate early before the search result is returned;

vi)   Cseq: 1 INVITE – this is the sequence number of the SIP call;

vii)   Subject: Urgent Search – this could be a plain text entry or provided as a field which an end point uses;

viii)   Contact: Joe Bloggs <sip: joe@atelco.net>

Additional fields which the invention provides in the SIP header indicate the SIP payload, and include:

ix)   Content-Type: application/SEDP – the type could be used to send an IP address, but in general is used to indicate that instead of a MIME type application, the application is a session description protocol according to the invention, SEDP (SEarch Description Protocol);

x)   Content-Length: 160 – this indicates the size of the payload, the number 160 is given by way of example only.

Figure 4 also indicates a SEDP according to an embodiment of the invention where a travel enquiry forms the body of the search expression. As shown in Figure 4, the SEDP comprises the following:

i)   Type: travel.air – the type field indicates a specific search field where appropriate;

ii)   F= Luton; 13,4,04; d = Ulan Botar, 28,4,04; ; ; - these fields indicate the point of departure is Luton, the departure date is 13 April 2004, the destination is Ulan Botar and the return data is 28 April 2004, followed by a number of null fields.

iii)   AP = British A, NOT Aeroflot, other – these are user preferences which indicate positive preferences (British Airways) and a dislike (Aeroflot)

iv)   P = Price – this field is being used to indicate that price is a priority feature of the search

v)   U = instant; update (phone1)- this field is being used to indicate that the search results should be communicated to the user end terminal indicated by phone 1 instantly when they arrive.

vi)   T = urgent – this gives the priority of the search;

vii)   OS = Hotel, Car Hire, Insurance – these are other services which are relevant given the category of the search, so the proxy server may wish to report information on these services if they are returned by a data source;

ix)   Sid = 7684^^*jjkkj84 – this is the ETS session identifier which resides above the SIP id, and which may or may not be associated with SIP.

Fields ix) and x) in the SIP header (and so also all the fields in the SEDP search description in the payload) may be encrypted in some embodiments of the invention, as indicated in the steps outlined in Figure 3 of the accompanying drawings.

Example 3

Figure 5 shows an very specific embodiment of the invention in which a user indicates they want a hotel room in a specific location (for example Salzburg) for a specific duration (for example 2 nights) at a specific cost (under £30 a night) in a search request in step 50.

In step 51, the ETS passes the search request and asks for more information, for example, the number of people, the exact location, and type of room, and a start date.

In step 52, the ETS forwards the message to the SIP proxy server whose SIP search server software SSS then processes the message (having de-encapsulated it).

In Step 53, the SSS sends an initial search to several travel search sites, some of which have enhanced SIP search interfaces but some of which may be standard world-wide web WWW servers.

In Step 54, the results returned are negative as the price cannot be met. The proxy server then may ask the user for more information or to revise the search and/or ask if the duration of the search could be extended so that search results could be returned at a later point, for example, 1 day later. In Figure 5, the user sends a response to the SIP server that it is possible to perform an extended search and for results to be provided 1 day later. The SSS then searches for hotels which do not have on-line booking facilities to determine email addresses and/or telephone numbers on travel web-sites and tourist information sites.

In Step 55, the SSS sends out email enquires in a format generated from the search request, and phones up hotels using text-speech and speech-to-text converters. The SSS obtains a near result and noting that the user is a member of at least one potentially

relevant organisation, provides this additional information to the hotel providing the near result to obtain a discount, for example 10%.

In step 56, the SSS checks the user's location database and determines that an SMS would be most appropriate (for example, the SSS may recognise that the time is outside the usual range of hours a user operates their computer at home or work). The SMS informs the user that a room has been found which meets all of the search requirements and asks the user if the booking should be automatically completed. This option is possible as the user has already registered bank account/credit card details to enable automatic purchasing and may have set a user preference to indicate that automatic purchasing should be enabled. In other embodiments, the user may set a user preference to indicate that if all criteria are met, the purchase should proceed automatically without a prompt.

In step 57 of Figure 5, the SSS books the room by providing the financial information to the hotel either by email or by fax and informs the user that this has been done. In Figure 5, the SSS waits until a confirmation number has been received from the hotel and then forwards this by SMS to the user. Alternatively, the SSS could notify the user as soon as the financial details have been sent to the hotel, or have been indicated as having been received by the hotel (for example, in the case of an email being sent when a receipt for reading is received or in the case of a fax, when the fax is confirmed as successful).

As has been mentioned above with reference to specific embodiments of the invention, it is a feature of the invention that both the end terminal software ETS and the SIP proxy server software SSS is arranged to modify a specific search expression (i.e., the phrase entered by the user on the end terminal) so that any requests for information which generated by the SIP automatically have an appropriate format for the destination to which the search request message is to be forwarded to.

The responses from these searches can be generated over several different timescales, ranging from virtually instantaneous for the conventional search engine results to several days, weeks, months or even years for the emailed requests for information. A user is able to indicate either in the search expression or as a user preference (which may be

derived from the search expression), the maximum duration a search may be conducted for. This could be implemented by indicating to the proxy server 14 a cut-off time after which search results returned should be discarded. Search results which are returned to the proxy server 14 after the initial search session has terminated can be processed as the SSS is able to associate the results with the original request using the unique search identifier associated with each search (which can be given in a form such as 1234567@aserver.telco.umts)which is issued by the SSS. The SSS is then able to process response and may iterate the search procedure to obtain additional information as the search results arrive by processing the results before the results are notified to the user.

The form of the results and the mechanism by which the user receives the results can all be set by user preferences. Typically, the user might indicate that results should be provided in one or more of the following forms:

i)   as a weekly summary of responses;

ii)   as an instant reply (within 1 minute);

iii)   only best match answers should be sent via email as high priority.

The user might always indicate that the search should be cancelled at any time, and this too can be easily accomplished as the SIP search number uniquely identifies the search. The user may also

The SSS can use the facilities of the SIP proxy server and its associated location database to locate the user at any given time (since the user's IP address is not a reliable location after several minutes or hours). The location database returns the users current terminal type and the SSS is able to adapt the response to suit the user's current terminal. As an example, consider if a tram enthusiast responds to a news group item that he has a 1933 GEC/Norwich tram in his back garden in Felixstowe. The SSS is able to determine that the sender of the email is at a user end terminal located in Felixstowe, and the SSS is able to determine the distance to Ipswich is sufficiently close (by accessing an appropriate application/database) to rank highly favourably with the user in view of the user having set a user preference that results from locations within a 20 mile radius are to be given high priority. The SSS then locates the user as being

mobile and so formats the result in the form of an SMS message to the user on his mobile phone.

The SIP server is able to assess the priority of a result according to its conformance with the user's predefined set of user preferences. If the SIP server considers the result to be urgent (which could occur either because the user designated the search as being urgent or because the user indicated that if the search result indicated a close location, or a cheap price etc) then the SIP server delivers the results to the user immediately (or within a timescale the user has given in his set of user preferences for urgent results to be delivered in) in the format the user has given in the set of user preferences. For example, an urgent search result could be set either to a user at his computer terminal if the user is currently logged on to the network at that terminal with his SIP identity, and/or (depending on the user preferences) the search results could be sent via an SMS or automatically generated vocal message to the user's mobile phone.

The user is able to generate a search query and set the user preferences indicate if results should be given in any format including audio. By providing search results in an audible format, persons who are visually impaired are able to receive search results in a more user-friendly manner. It is possible for persons who are visually impaired to set their ETS software user preferences so that it generates a verbal confirmation of the search string they have entered (or to repeat a spoken search request if such a mode of search request generation has been used).

User preferences could be associated by the SIP server SSS software module with the senders SIP URI so that the search results are sent to a destination user end terminal based on the search content (for example, video files could be sent to the user's work email address if this had a higher bandwidth connection to the internet than the user's home terminal equipment instead of the user's home email address). Alternatively, the SIP SSS software could be configured by the user preferences to automatically compress the search results to a predetermine bandwidth, for example, by sending still clips of a video file to one location and the full video file to another location. Alternatively, the SIP SSS software could simply notify the user that a large file was located by the search and store the large file on the SIP server for a predetermined amount of time until the user downloads the file.

For added security such centrally stored files may only be accessible if the user further enters a security key which the SIP server 12 could send either with the original notification that the file has been located and/or the address where the file could be accessed or via a separate notification.   The SIP server does not need to use message type notifications such as vocal messages, email or SMS to notify a user of a search result. Instead, the SIP server may deposit a file containing the search results in the user's public drop file etc.

@If the user has requests a search to locate an item for purchase, the SIP server could be provided with the user's financial information such as their credit card numbers etc. and any other information needed to make an automatic purchase of the requested item if the price conforms with the user's set preferences.   As an example, consider a SIP server which polled a flight or holiday site for example, and located for example, a return flight to Cairo on the outward and inward dates the user has requested at a specific price. If the price is, for example, either below the user's "immediate purchase" limit or is the cheapest price of a set of search results returned within a given period of time for searching, the SIP server may effect an immediate purchase of the flight so that the price information is correct and the price does not change by the time the user receives the search results.   It will be obvious to those skilled in the art that such an automated purchase scheme is not limited to the purchase of airline flights, but could be extended to any item or service offered for sale over a distributed computer system, including items which are under auction but which have an immediate purchase option.

As the proxy server is able to intelligently query certain locations which it believes would be more appropriate for the user's search query, the proxy server can return results which indicate a preferential arrangement with the site providing the search result. This is particularly so if a price is associated with the search query. For example, the search engines which the proxy server access could be configured to always provide a certain predetermined discount (which may be fixed or only temporary in duration). A SIP server search service can then be provided to users whose user preferences indicate they have subscribed to a specific group or body.

For example, if a user indicated they were a member of the Automobile Association and also a civil servant, and the user requested a search for the cheapest insurance for an "S-reg" Volkswagen Punto with ten years no claims bonus, the SIP server could provide this additional member information to the servers of the insurance companies it contacts and the results returned could indicate if an insurance company is able to offer an additional discount to the user based on the organisations indicated in the user preferences.

Alternatively, if may be that the Internet Service Provider (or equivalent body) that the user has subscribed to has discounts with certain third parties such as hotels, software providers, etc., and so the SIP server itself is configured by the Internet Service Provider to offer one or more discounts to the user when it returns a result from the third parties to the user.

The SIP server could keep track of the purchases the user makes with certain bodies and assign one or more points to the user according to the amount and/or number of purchases made, which could be reset within certain timescales. These "points" could then be spent by the user, for example, to get a certain discount off a returned search price or to get an item for free if the search returns a price for that item which could be bought outright with the "points" the user has. In this way, a "reward" scheme similar to the reward schemes currently offered by many chain store retailers can be offered to the user via the SIP search mechanism, whereby each item purchased attracts points and a user is able to purchase further items and/or discounts off other items with the points they accumulate.

Those skilled in the art will appreciate that the spirit and scope of the invention is not limited to the specific embodiments described herein above but instead is defined by the accompanying claims. In particular, the SIP proxy server 14 may itself comprise a distributed computer system, for example, the proxy server may retrieve the user preferences from a separate data base storage system.

An embodiment of the invention involving a SIP search mediated purchase may involve user preferences which are associated with another person apart from the user themselves, for example, a friend or family member. For example, consider where a

user wishes to search for an entertainment venue such as, for example, if a birthday party for a young child is to be arranged. A user may enter the key words "child's party venue" and find search results based on their own preferences. However, if for a family member the user may enter "daughter's 7th birthday party". The ETS recognises the term "party" and provides the user with a set form modified to take into account certain personal preferences which are associated with the user's daughter. In this way, the ETS may bias the results provided to favour those which reflect the user's daughter's known interests, e.g. a children's book character etc.

As an example, the ETS may prompt the use to provide one or more of the following information items in the search expression:
PARTY - (Anniversary, Wedding, Birthday...)
LOCATION (Postcode, MAP....)
Number of Guests..
Age of guests
Entertainment (Band, Puppets ... options given depend on age/type of
party..)
Date(s) date with alternatives
Food (Buffet, burgers, cold...)
transport (Bu, Limo...)

Once these details have been provided, the ETS encapsulates the data provided and sends it to the SIP server. The SIP server analyses the component expressions returned for each data entry by the user and might search on each. In this way, the SIP server can seek out suitable venues using an initial search process and then perform a more complex SIP search which could include:
Filling in web forms - eg for hotels
Searching list of local entertainers (eg in yellow pages) and contacting them appropriately by phone/email etc.

Of the search results obtained, some may be provided immediately to the user, eg Hotel Fawlty Towers can
provide a complete package. Later further "packages" - put together by the search engine - could be sent (by a pre-set time) - with notification to SMS as usual

In addition the search software could explore if a better fit (with the original search request plus user references) can be made by slight changes to the date/location. This could provide a cheaper better venue but perhaps slightly further away.

Example 2 - Spare part for classic car

Consider where the user wants to buy a specific part, e.g. a petrol pump, for an specific car, e.g. the Alfa GT Junior 1600 1972. The ETS packages the search request and sends it to server. The proxy server knows Alfa parts suppliers already (for example, the proxy server may have built up a database of such common enquiries because car parts are common enough to crawl the web at night for and cache URLs). However, if the SIP proxy server sends a search request containing these specific details and receives a response that none of the suppliers it has already details of can provide this part the SIP proxy server may notify the user that the search may take longer than initially expected. The SIP proxy server may then initiate a full search, resulting in a search engine trawling the web to locate, for example, 2nd hand part suppliers. This result could be returned to the SIP proxy server which may then further interrogate the resulting part suppliers via a suitable medium such as an email request. The Email request may ask for information to be provided in a specific format. The information is then sent to the proxy server in the designated format which enables the SIP proxy server to extract certain information from it. For example, the SIP proxy server could receive a reply which asks if pump is Webber or Morelli. Search engine would not know how to process such a response and so forwards it to the user, for example, by an SMS notification which contains the enquiry. The User may reply he doesn't know how to tell the difference. The proxy server would then process this response by asking this question to an Alfa news group. The proxy server could then forward responses received to the user who may now response with the appropriate level of detail. The proxy server may now forward this response to a search engine which now sends the full request to the news group used as well as the identified supplier, together with details of a user preference such as the

users information of his membership of Alfa owners club to ensure the user is quoted a price which includes a 10% discount. The response may be passed on to the user who may select for the proxy server to complete the transaction if this can be done electronically on-line over the internet. Alternatively, if the best price supplier does not accept electronic payment, the search engine could forward this information with the price quoted and generate an alert to indicate this method of payment is not available. Alternatively, the proxy server could process the information and trigger an alert to search for more information about the supplier on the internet. If the results indicate the supplier is a very small dealer and no information about the company is available, the proxy server or search engine may indicate that cheque is not a suitable form for payment and instead set up a third party escrow account to hold money (for example via trusted escrow) and then broker deal. If a week later the replacement water pump then fails and the user wants to repeat the process, the SIP server can use the results from the previous search to repeat the process.

Figure 6 shows another embodiment of the invention in which a user wishes to purchase some insurance for a motor vehicle. In the specific embodiment shown in Figure 6, the user preferences are the preferences of the person performing the search, however, it is possible for preferences associated with a key word such as "boss" or another person's name "Joe Bloggs" may be provided where a person such as a personal assistant wanted to locate specific information for another person.

In Figure 6, in step 60 a user makes request to buy insurance for a vehicle. In step 61, the ETS recognises from the search expression the user has entered that a standard type of purchase search is being requested. The ETS may be able to recognise the type of search by using the certain key words which indicate more popular searches to retrieve a form requesting more information for such searches. The ETS may then provide the user with such a standard form (car, age, garage?...)and the ETS could then corrects any mistakes and adds any relevant information (eg AA member, also has second car (classic) which the ETS is aware from the user's stored preferences) in step 61.

In step 62, the ETS encrypts the expanded search expression into a SIP message which is then sent to the SIP proxy server which passes the message to the proxy server search software SSS.

The proxy server search software SSS consults a number of information sources by: filling out web forms, text to speech calls, emails, etc, using user preferences either provided by the ETS or stored at the proxy server and local information which is specific to the search (step 63).

Step 64 - the results come back at different times, each search result being updated to indicate if the optimum result located so far. For a purchase search the optimum criterion will be price unless the user has set a user preference or entered a key word to indicate another overriding optimum criterion. The user is then informed of the cheapest(headline rate) by SMS over (say) next week and sent a key (e.g. a url) to get the full details (Restrictions, excess...)(step 64).

Step 65 indicates how a user can buy automatically by informing the SIP Search Engine at the proxy server to send his credit card and address details to a specific insurance company whose address details have been located by the search and which the search has indicated as providing insurance at a specific cost which takes into account the fact that the user is a member of certain motoring organisations. The insurance company might request proof of no claims and the search engine might send back his old policy number automatically (step 66).

The proxy server may also be able to interrogate one or more of the insurance web-sites located by the search process to determine that if the user were to join a specific organisation then an additional discount may be available.

In one embodiment of the invention the SIP Search Software modifies the terms in a search expression to optimise the purchase price of an item requested by the search expression. In this way, the SIP search software is able to facilitate the purchase of complex items in which a number of parameters can determine the purchase price. The user may indicate such terms can be varied by pre-pending or appending a symbol to the search term that the SIP search software will recognise as indicating a variable

search parameter (e.g. the date, the number of people at the party, location in the party example) in a way no person would have time to do. Similarly, for travel to a destination, the user may indicate the destination is fixed but one or more of the time, duration of travel and departure date are flexible. The sever might then perform a search which researches the best rates, offers (in a way that a user would never have time to do) and use that to optimise the prices so that the results returned are progressively cheaper. Other examples where the SSS modifies a search to optimise it could include the SSS negotiating to get trade discounts or certain seats for theatre shows.

In another embodiment of the invention, the SSS may operate directly to bulk buy/pre-book popular items (eg London Show tickets) automatically - knowing (from past info and user info on its data base) that it can sell these items to certain users. By exploiting the database of user preference information, the SSS is able to target advertising mail shots to users who would find such items of interest, and so offer particularly good deals at the last minute as the SSS would be aware of the location of users. For example, if a user is in Cardiff, the SSS may know this by the activity reported by the user's mobile terminal, and so advertise tickets for a theatre show in Cardiff that evening. This targeted advertising based on user preferences and knowledge of a user's current whereabouts is highly advantageous.

CLAIMS

1. A method of purchasing an item, the method enabling a user to search for
    information on the cost of an item on a distributed computer system, the method
    comprising:

    generating a search request for the item at a user terminal;

    modifying the search request to indicate at least one user preference;

    forwarding the search request to a server adapted to retrieve data from the
    distributed computer system, the server adapted to provide a search result to a user
    terminal selected in accordance with a predetermined user preference dependent on
    the extent to which the search result conforms with the search request, whereby the
    user is able to purchase the item at the cost informed by the search result.

2. A method as claimed in claim 1, wherein a user preference includes financial
    information personal to the user and at least one criteria which a search result must
    conform which initiates the automatic purchase of the item prior to the user being
    informed of the search result.

3. A method as claimed in claim 1 or claim 2, in which the search result is provided in a
    medium and format selected by the user for a user terminal to which the search
    result is to be forwarded.

4. A method as claimed in claim 3, wherein the user terminal is selected according to
    the extent to which the search result conforms with the search request.

5. A method of searching for data to be retrieved from a distributed computer system,
    the data including an item and associated cost information, the distributed computer
    system comprising at least one user terminal capable of communicating with a proxy
    server, the proxy server being capable of communicating with at least one other
    server capable of retrieving information from the distributed computer system, the
    user terminal being adapted to be operable by a user who is registered with the
    proxy server with a unique permanent user identity associated with one or more
    static or dynamic addresses, the user identity being associated with a set of user
    preferences, the method comprising the steps of:

generating a search request at one of said at least one user terminals, the search request indicating at least one search criterion to be met by the data to be retrieved;

sending a search request message encapsulating the search request to the proxy server;

associating the search request message with a unique search number associated with the user's unique identity;

forwarding the search request message to at least one search server arranged to process the received search request message;

performing a search according to the encapsulated search request;

sending a search result encapsulated in a search result message to the proxy server;

de-encapsulating the search result message;
processing the search result according to the set of user preferences;

selecting one of said at least one user terminals according to the set of user preferences; and

sending an search result message encapsulating the processed search result to said at least one selected user terminal.

6.   A method as claimed in claim 5, further including the step of the proxy server purchasing the item at the cost indicated by the search result and modifying the search result to indicate the item has been already purchased, if at least one predetermined user preference indicates personal financial information of the user which enables the purchase transaction to be completed by the proxy server, the proxy server being configured to automatically purchase an item at a designated cost if at least one user preference indicates that an automatic purchase can occur if the search result meets at least one predetermined search criterion.

7.   A method as claimed in any previous claim, wherein the distributed computer system supports the session initiation protocol (SIP), and wherein the user terminal is a SIP registered terminal, the proxy server is a SIP proxy server, and the user is registered at the proxy server with a unique SIP address.

8.   A method as claimed in claim 7, wherein the search result message is a SIP

message which is sent to the user at an address determined by the SIP proxy
server to be the current location of the user who requested the search.

9. A method as claimed in claim 8, wherein the search result SIP message is sent to a
    plurality of addresses associated with the user's registered SIP identity.

10. A method as claimed in claim 7 or claim 8, wherein the search result SIP message is
    sent to an address associated with a different user terminal than the user terminal
    operated by the user to send the search request to the SIP proxy server.

11. A method as claimed in any preceding claim, wherein the user terminal is a mobile
    device.

12. A method as claimed in any preceding claim, wherein the set of user preferences
    comprises a formatting user preference which indicates how the search result should
    be formatted.

13. A method as claimed in any one of claims 1 to 12, wherein the set of user
    preferences comprises a plurality of formatting user preferences, each formatting
    user preference being associated with a type of user terminal.

14. A method as claimed in any previous claim, wherein the method further comprises
    the step of the proxy server modifying the set of at least one search criterion
    according to said set of user preferences.

15. A method as claimed in any previous claim, wherein at least one user preference
    indicates a scheme to which the user has subscribed which may modify the cost of
    an item returned by the search.

16. A method as claimed in any previous claim, wherein the method further comprises
    the step of the proxy server modifying the search result according to a set of user
    preferences.

17. A method as claimed in claim 16, wherein the proxy server software modifies the

18. search result by modifying the cost of an item returned according to a pricing scheme to which the user has subscribed.

19. A method as claimed in claim 16, wherein the proxy server software modifies the search result by modifying the cost of an item returned according to a pricing scheme provided by the proxy server software.

20. A method as claimed in any previous claim, wherein the at least one search server to which said search request message is forwarded to by the proxy server is determined by the proxy server in accordance with said set of at least one user preferences.

21. A method as claimed in any previous claim, wherein the proxy server modifies the search result received to identify an address to which the search request can be forwarded to in the form of an electronic email.

22. A method as claimed in any previous claim, wherein the proxy server processes the returned search result to remove at least one result which is indicated by at least one user preference as not relevant to the user's listed interests.

23. A method as claimed in any previous claim, wherein the proxy server processes the returned search result to modify any returned cost value for an item indicated by the search according to a discount scheme to which the identity of the user is associated.

24. A method as claimed in any previous claim, wherein the proxy server processes the search result to prioritise the delivery of at least one item listed by the search result to the user in accordance with the extent to which said at least one item conforms with the set of at least one search criterion.

25. A method as claimed in claim 24, wherein the proxy server alerts the user to a search result by encapsulating the search result in a small message service SMS message which is sent to the user over a communications network.

26. A method as claimed in any previous claim, wherein the search request is generated by the user terminal modifying a previously stored search request in accordance with an updated set of at least one search criterion.

27. A method as claimed in any previous claim, wherein the set of at least one user preferences specifies a maximum time limit for the search results to be generated.

28. A method as claimed in any previous claim, wherein the distributed computer system is connected over a communications network.

29. A method as claimed in any previous claim, wherein the session during which software provided on the user terminal interfaces with software provided on the proxy server to send the proxy server the search request message is terminated when the proxy server sends the search result message to the user.

30. A user terminal arranged to be operable by a user for use in generating a search request according to the method of any of the previous claims.

31. A proxy server arranged to receive a search request message from a user terminal as claimed in claim 30, the proxy server being arranged to be used in a method according to any of claims 1 to 29.

32. A suite of computer programs arranged to implement a method according to any one of claims 1 to 29, the suite of computers being provided on the distributed computer system.

33. A signal carrying a search request generated by a method according to any one of claims 1 to 29 over a communications network comprising the distributed computer system.

34. A signal carrying a search result generated by a method according to any one of claims 1 to 29 over a communications network comprising the distributed computer system.

35. A communications network arranged to communicate a signal according to either claim 33 or claim 34.

36. A method of providing an item at a discounted cost to a user over a communication network comprising a distributed computer system, the method comprising performing a search for the item and associated cost information according to any one of claims 1 to 6, wherein the proxy server automatically provides the server software at a site indicated in the search result as able to provide the item requested by the search request with information derived from the user's preferences, the information including:

   sufficient financial information to enable the user to purchase the item;

   sufficient address information to enable the item to be sent to an address designated by the user.

37. A method as claimed in claim 36, wherein the items to be purchased are sent to a postal address.

38. A discount purchase scheme in which a user is provided with an item using a method as claimed in claim 36, the method further comprising discounting the cost of the item returned by the search by a predetermined amount in accordance with a discount rule determined by the proxy server.

39. A discount scheme as claimed by claim 38, wherein when an item is purchased a user preference is updated to reflect a predetermined number of points which can be indicated by the user in at least one future search request for an item and associated cost information.

40. A discount scheme as claimed by claim 39, wherein the points indicated by the user preference generate a discount in the cost of an item indicated by a search result which at least partially conforms with the future search request.

41. A method enabling a user to search for information on the cost of an item on a distributed computer system, the distributed computer system including an end

terminal of the user, a proxy server, and at least one information source, the method comprising:

generating a search request for the item at the user terminal;

modifying the search request to indicate at least one user preference;

forwarding the search request from the proxy server, the proxy server being adapted to retrieve data from one or more of said data sources, the proxy server being adapted to process a search result received from a data source and provide additional information to further interrogate a data source identified by said search result to receive a second search result, the proxy server being adapted to provide the second search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

42. A method as claimed in any one of claims 1 to 29 or claim 41, wherein the SIP search software optimises the purchase of complex items requested by prompting the user for additional parameters which relate to the purchase.

43. A method as claimed in any one of claims 1 to 29, 41 or 42, wherein a user enters a search request and the SIP server modifies the terms in the search request to optimise the purchase price of an item.

44. A method as claimed in claim 43, wherein the SIP server provides a notification of the results to a user end terminal and the user increases the bandwidth available to receive a search result following said notification.

Abstract

A method of purchasing an item, the method enabling a user to search for information on the cost of an item on a distributed computer system, the method comprising: generating a search request for the item at a user terminal; modifying the search request to indicate at least one user preference; forwarding the search request to a server adapted to retrieve data from the distributed computer system, the server adapted to provide a search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

Figure 1.

Phone

14c

Speech<->text

12b

Re-configure
Request using:
Preferences
Past results
User location

SIP User Agent

Search Software
Module 3

Search Engine
or Database

14b

Advertise
Services

Search Software
Module 2

12a

SIP Proxy
Server

HTTP

10b

Web
Server

14a

User

10a

Format request

Search Software
Module

SIP User Agent

Figure 1

20 — USER INITIATES SEARCH SESSION AT USER TERMINAL AND GENERATES SEARCH REQUEST

21 — USER TERMINAL SOFTWARE (ETS) MODIFIES SEARCH REQUEST

22 — ETS ENCAPSULATES SEARCH REQUEST IN SIP MESSAGE, AND SENDS TO PROXY SERVER

23 — PROXY SERVER PASSES ENCAPSULATED SEARCH REQUEST MESSSAGE TO PROXY SERVER SEARCH SOFTWARE (SSS)

24 — PROXY SERVER SEARCH SOFTWARE SSS DE-ENCAPSULATES SEARCH REQUEST, PROCESSES REQUEST ACCORDING TO USER PREFERENCES

25 — THE PROXY SERVER FORWARDS PROCESSED REQUEST TO DATA SOURCE IN APPROPRIATE FORMAT

26 — DATA SOURCE PROCESSES SEARCH REQUEST, GENERATES SEARCH RESULT, DATA SOURCE FORWARDS SEARCH RESULT MESSAGE TO PROXY SERVER

27 — PROXY SERVER DE-ENCAPSULATES SEARCH MESSSAGE, SSS PROCESSES SEARCH RESULT AND DELIVERS IN ACCORDANCE WITH USER PREFERENCES TO DESIGNATED USER TERMINAL(S)

Figure 2

USER INITIATES SEARCH SESSION AT USER TERMINAL – either using text or speech — 30

ETS parses search request – identifying possible pro-forma (eg travel, financial…) — 31

ETS Requests additional information or queries possible mistakes (eg departure date before arrival date, cost preference..) — 32

ETS checks cache for recent similar searches – if similar search is held in cache on the terminal or the server then only updates need be sent — 33

ETS formats search request – eg Travel requests have pre-set destination, time etc fields.. — 34

ETS encrypts request with session key (established when user authenticates at start of association of address and SIP id) — 35

ETS places encrypted payload in SIP message with TYPE set at SEDP (Search Description Protocol) — 36

ETS sends to proxy server — 37
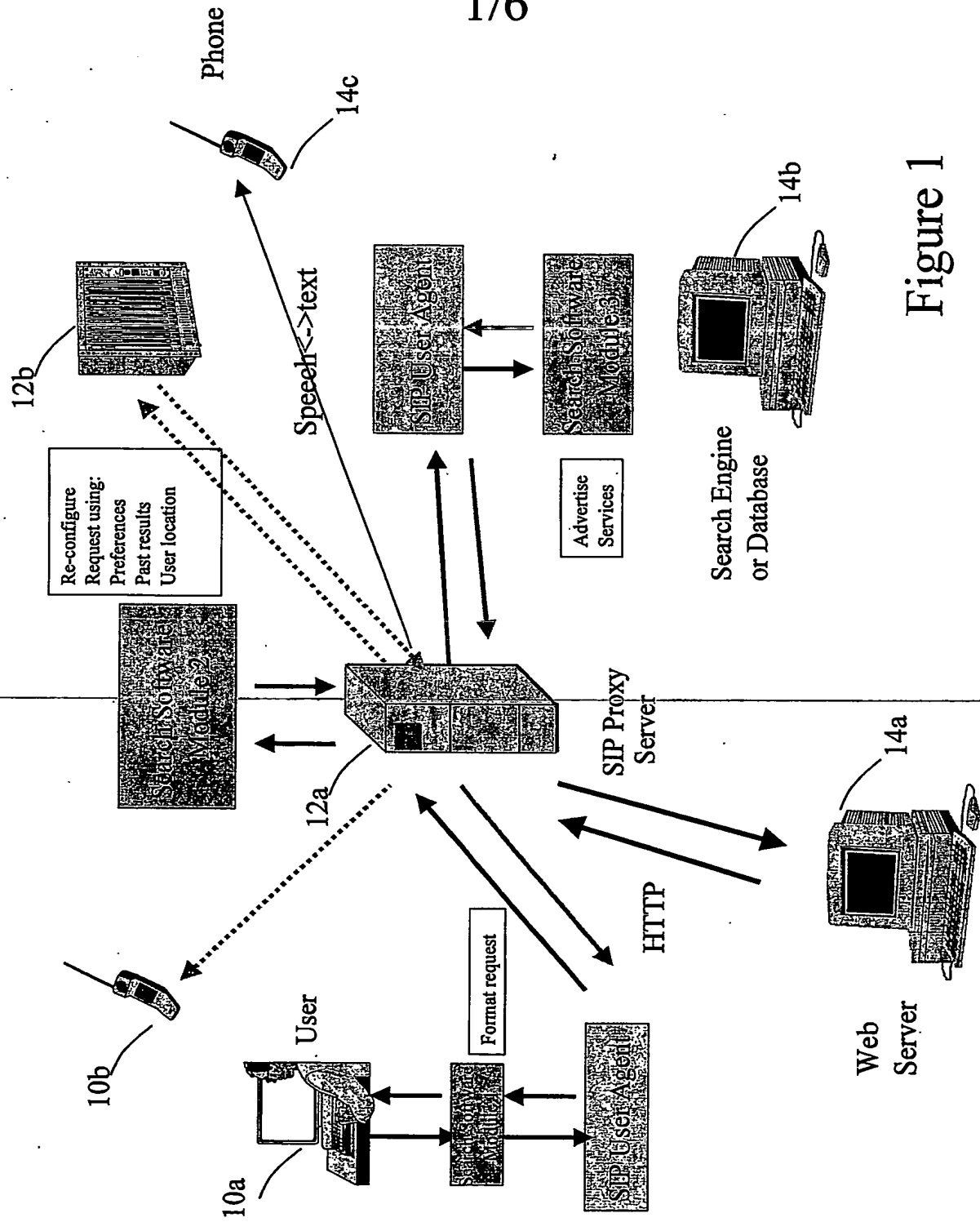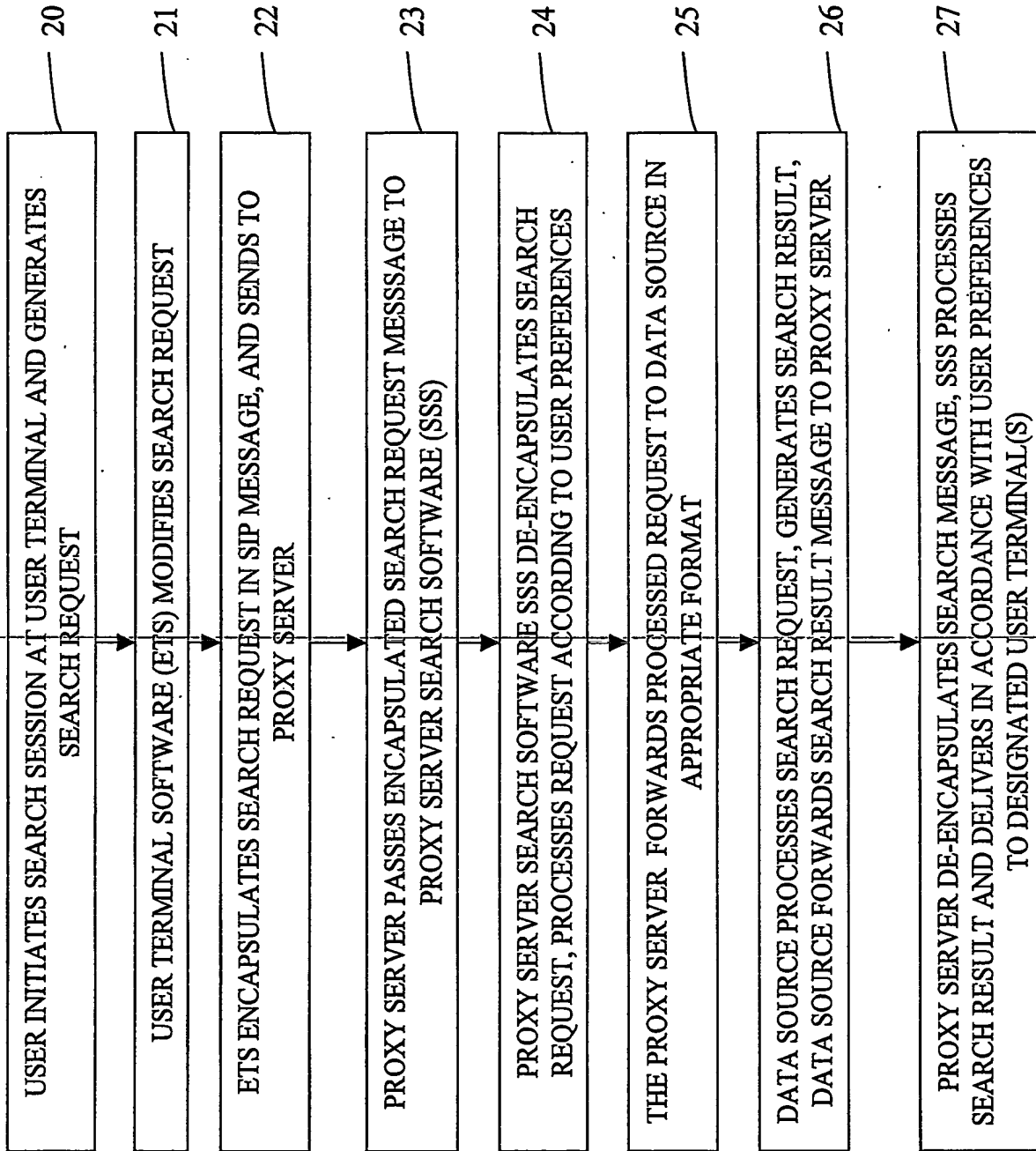
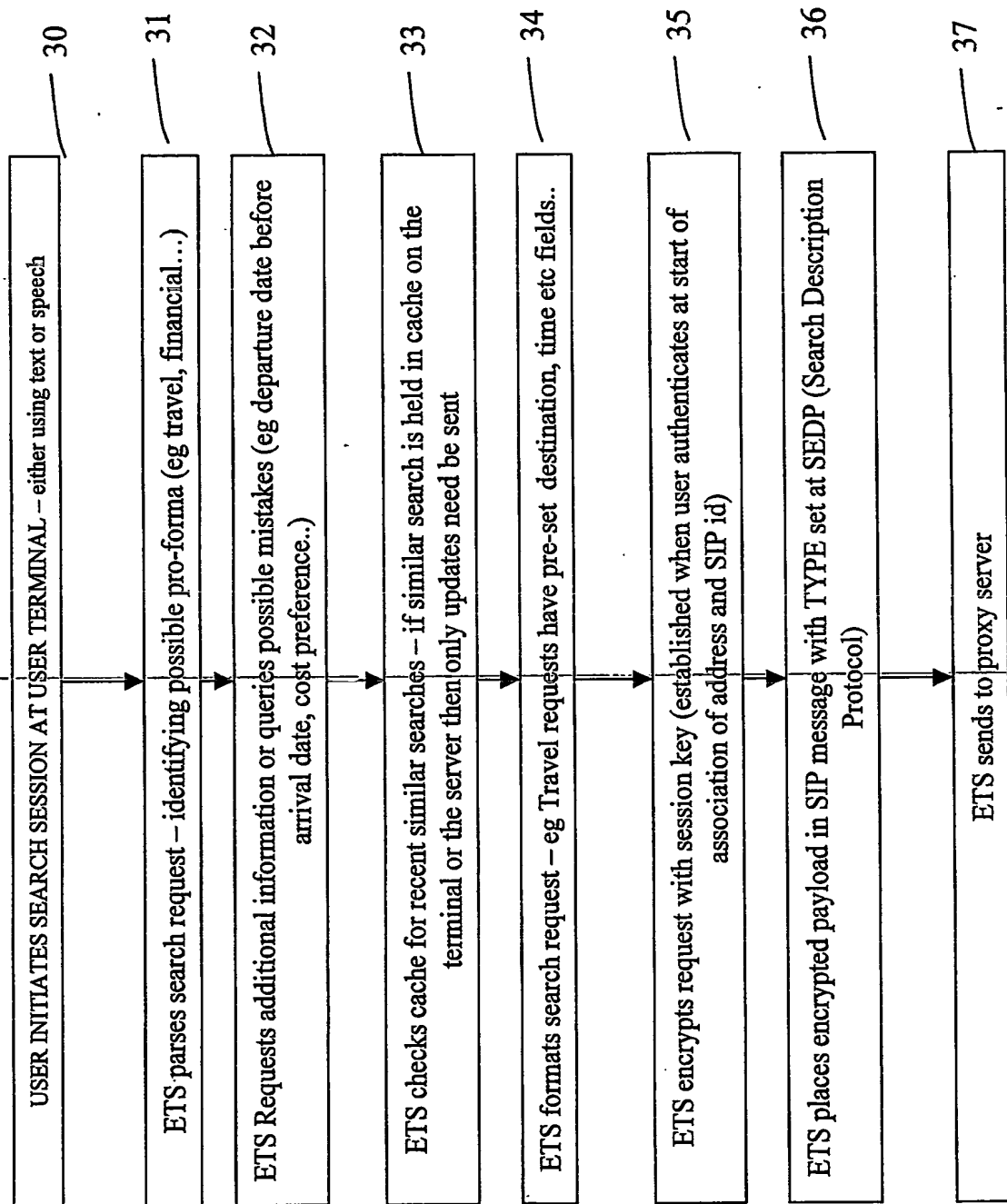Figure 3

```
INVITE sip:search@bt.co.uk SIP/2.0
Via: SIP/2.0/UDP spain.tel:5060
From: joe.bloggs    <sip:joe  @atelco.net>
To: Search <sip:   Sea@uk.net>
Call-ID: 1000001@atelco   .net
CSeq: 1 INVITE
Subject: Urgent search
Contact: Joe Bloggs   <sip:joe  @atelco   .net>
Content-Type: application/SEDP
Content-Length: 160

Type = Travel.air
F=Luton;13,4,04; d=Ulan Botar; 28,4,04;;;
AP=british A, NOT Aeroflot, other
P=price
U=instant; update (phone1);
T=urgent
OS= Hotel, Car Hire, Insurance
Sid 6784^^*jjkkj84
```
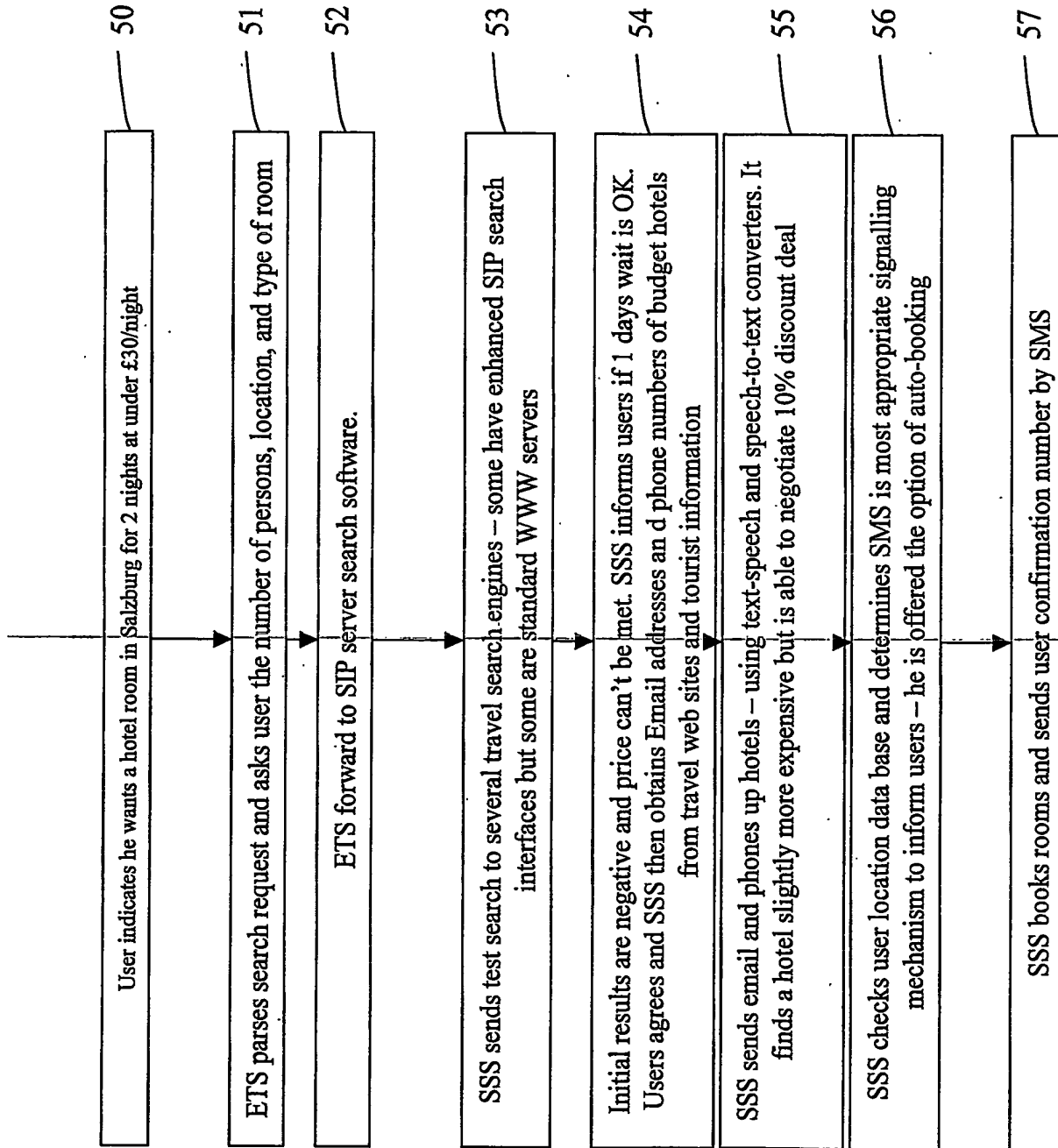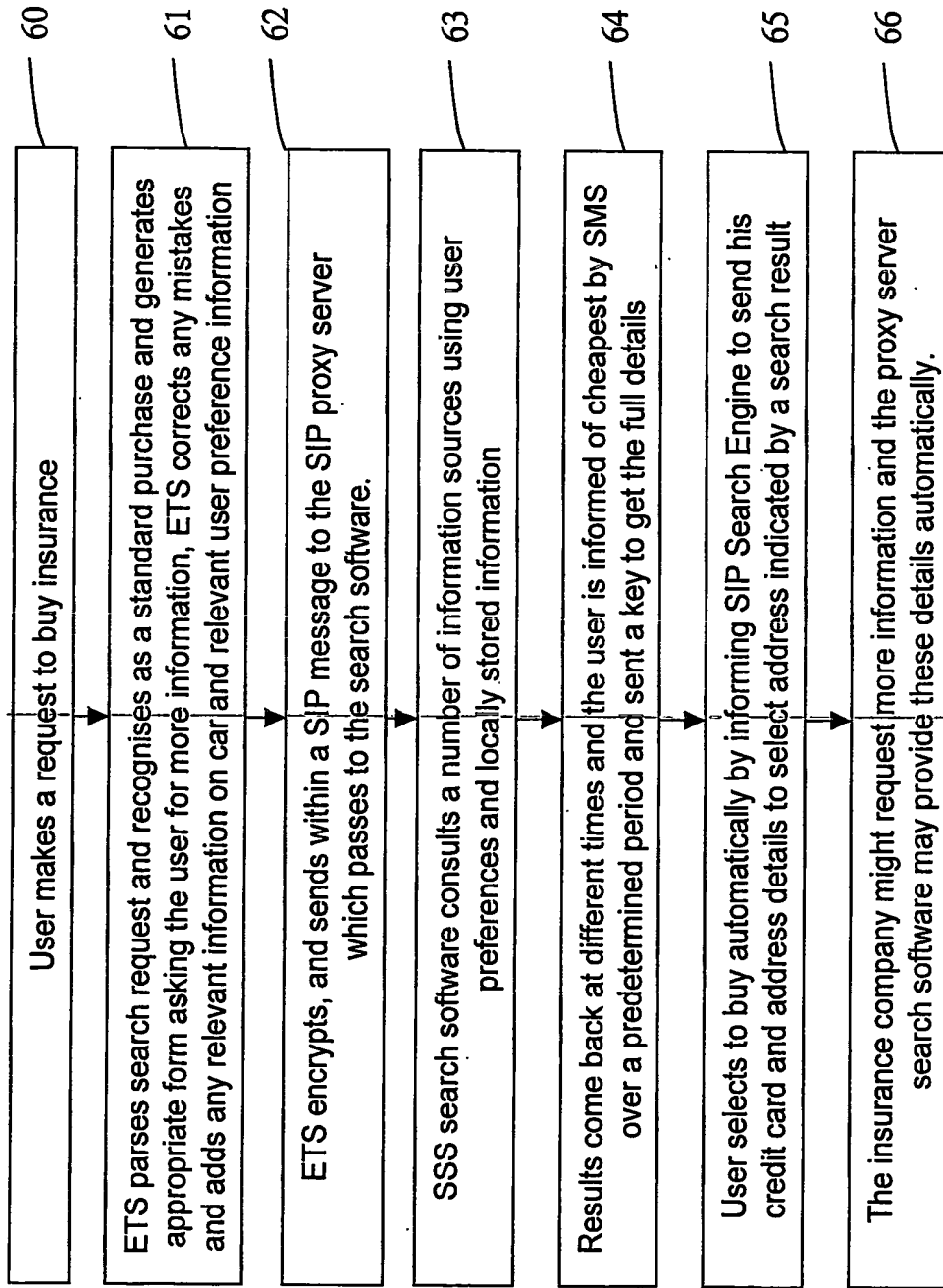
SIP header

SEDP Search description

Figure 4

50 User indicates he wants a hotel room in Salzburg for 2 nights at under £30/night

51 ETS parses search request and asks user the number of persons, location, and type of room

52 ETS forward to SIP server search software.

53 SSS sends test search to several travel search engines – some have enhanced SIP search interfaces but some are standard WWW servers

54 Initial results are negative and price can't be met. SSS informs users if 1 days wait is OK. Users agrees and SSS then obtains Email addresses an d phone numbers of budget hotels from travel web sites and tourist information

55 SSS sends email and phones up hotels – using text-speech and speech-to-text converters. It finds a hotel slightly more expensive but is able to negotiate 10% discount deal

56 SSS checks user location data base and determines SMS is most appropriate signalling mechanism to inform users – he is offered the option of auto-booking

57 SSS books rooms and sends user confirmation number by SMS

Figure 5

60 — User makes a request to buy insurance

61 — ETS parses search request and recognises as a standard purchase and generates appropriate form asking the user for more information, ETS corrects any mistakes and adds any relevant information on car and relevant user preference information

62 — ETS encrypts, and sends within a SIP message to the SIP proxy server which passes to the search software.

63 — SSS search software consults a number of information sources using user preferences and locally stored information

64 — Results come back at different times and the user is informed of cheapest by SMS over a predetermined period and sent a key to get the full details

65 — User selects to buy automatically by informing SIP Search Engine to send his credit card and address details to select address indicated by a search result

66 — The insurance company might request more information and the proxy server search software may provide these details automatically.

Figure 6

HNNEY - H30422

PURCHASING SCHEME

This invention relates to a purchasing scheme which enables a user to purchase an item over a communications system. The purchasing scheme enables a user to purchase an item which is returned as a search result generated in accordance with the search system described in the inventor's patent application "SEARCH SYSTEM AND METHOD " co-filed with this patent application, a copy of which is filed herewith whose contents are hereby incorporated by reference.

Currently, when a person performs a search using a conventional search engine, the search engine is not able to provide additional information on the user which may affect the cost of an item which the person is searching for. A typical example, is if a user wished to search for car insurance. The user must enter with the search any membership information regarding bodies such as who the person's employer is or if they are a member of an automobile club or association if they want to receive information which reflects the discounts which may be available. Further, if a person simply wishes to purchase an item which is below a specified price, the person has to review the search results and manually enter their details with the appropriate site if such a service is offered on line (or if not contact the prospective vendor in some appropriate manner (for example, either call, fax, email or write a letter to them) and provide their financial and address details before the item (which may be a service) can be purchased.

Moreover, there are no incentive schemes for online purchasers in the same manner in which chain stores are currently able to offer incentive schemes to their customers.

The invention seeks to mitigate and/or obviate the disadvantageous in the prior art by providing a purchase system which uses a search system to locate an item by providing additional information on the purchaser by including user preferences information in the search request. .

Advantageously, one aspect of the invention is able to automatically provide additional information on the user which enables a user to purchase an item identified by the

search system at a cost which is modified by a proxy server mediating between the user and a search server.

Advantageously, the invention uses a protocol which enables a user to be associated with a permanent identity which may be associated with a static or dynamic address, for example, a session initiation protocol (SIP) identity. This enables the user to retrieve data from a distributed computer system to enable a search result to be sent to the user even if the initial search session has terminated. The invention also enables a user to purchase an item even if the user is not in communication with the SIP proxy server at the time the item is purchased.

This invention relates to an automatic purchase scheme which uses the search system and method of searching described in the inventor's copending patent application "SEARCH SYSTEM AND METHOD" which allows data to be searched for and retrieved over a distributed computer system. The search system and method use a protocol which enables a user to be associated with a permanent identity which can be mapped to an address (which may be either static or dynamic). In particularly, but not exclusively, the search system and method uses a permanent identity such as a Session Initiation Protocol (SIP) User Resource Identifier (URI), to retrieve data from a distributed computer system to enable a search result to be sent to the user even if the initial search session has terminated.

Search systems for retrieving data (i.e., information) from distributed computer systems such as the Internet are known to have certain limitations. Internet search sites, for example Google™, are configured to return results within a time limit which appears almost instantaneous to the user of the search site.

Consider the case where a person enters a highly complex search request on such a search site, for example, a search request involving perhaps a complex string of key words and Boolean operators. If the search request is sufficiently complex then conventional search sites would not be able to return any results complying with the search query criteria in the short period of time which is usually set for determining and displaying the search results.

A search entered on a conventional search site usually has to generate at least one search result within a specific period of time or the search site will display a negative search result to the user of the search engine. There is no mechanism to accommodate complex searches or to provide a search storage facility so that a user may in fact "log-off" the search site and retrieve their search results at a later point in time. The users of such search sites are effectively limited to the length of session that they can have with the search "server".

Other limitations include the user of a search site being unable to select where the search results are sent or how the search results are to be formatted and presented. For example, a user may enter a search request on a personal computer type terminal having a conventional display attached. However, the user may not want the results until a few hours have passed so that complex information can be retrieved and they may want the results to be displayed on their mobile phone.

Another limitation is that only restricted preferences are currently stored for users normally on the user's terminal or on the search "server". For example, preferences stored on the user's terminal can be provided by Internet Explorer 6 (IE6) predictive typing, stored lists past sites or content filters. Yahoo portal customisation is an example of the latter. However if one were to search for Manchester City and want information on the city itself and not the football club of the same name, it would be impossible to record a negative preference such as "AND NOT football" which would be retained for parsing future search results.

Another limitation is that current search methods do not support providing results in a variety of different formats. For example, current search methods do not enable a search engine to send an Email, phone a hotel and fill in a web form automatically. This is because search methods known in the art do not have the deeper understanding of the search preferences which would be required to implement such a sophisticated search method, as known search methods have no mechanism for understanding the context of the search, for example, – where the user is, the time, the preferences, etc, nor do current search methods offer a permanent state storage.

The present invention seeks to mitigate and/or obviate the above limitations known in the art by providing a search system and method which supports complex search queries being entered and which modifies searches according to user preferences. User preferences are also used to perform supplementary searches to obtain more detailed information and to designate end terminals where search results are to be sent.

Summary Statements of the Invention and Advantages

A first aspect of the invention seeks to provide a method of purchasing an item, the method enabling a user to search for information on the cost of an item on a distributed computer system, the method comprising: generating a search request for the item at a user terminal; modifying the search request to indicate at least one user preference; forwarding the search request to a server adapted to retrieve data from the distributed computer system, the server adapted to provide a search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

A user preference may include financial information personal to the user and at least one criteria which a search result must conform which initiates the automatic purchase of the item prior to the user being informed of the search result.

The search result may be provided in a medium and format selected by the user for a user terminal to which the search result is to be forwarded.

The user terminal may be selected according to the extent to which the search result conforms with the search request.

A second aspect of the invention seeks to provide a method of searching for data to be retrieved from a distributed computer system, the data including an item and associated cost information, the distributed computer system comprising at least one user terminal capable of communicating with a proxy server, the proxy server being capable of communicating with at least one other server capable of retrieving information from the

distributed computer system, the user terminal being adapted to be operable by a user who is registered with the proxy server with a unique permanent user identity associated with one or more static or dynamic addresses, the user identity being associated with a set of user preferences, the method comprising the steps of: generating a search request at one of said at least one user terminals, the search request indicating at least one search criterion to be met by the data to be retrieved; sending a search request message encapsulating the search request to the proxy server; associating the search request message with a unique search number associated with the user's unique identity; forwarding the search request message to at least one search server arranged to process the received search request message; performing a search according to the encapsulated search request; sending a search result encapsulated in a search result message to the proxy server; de-encapsulating the search result message; processing the search result according to the set of user preferences; selecting one of said at least one user terminals according to the set of user preferences; and sending an search result message encapsulating the processed search result to said at least one selected user terminal.

The method according to the second aspect may further include the step of the proxy server purchasing the item at the cost indicated by the search result and modifying the search result to indicate the item has been already purchased, if at least one predetermined user preference indicates personal financial information of the user which enables the purchase transaction to be completed by the proxy server, the proxy server being configured to automatically purchase an item at a designated cost if at least one user preference indicates that an automatic purchase can occur if the search result meets at least one predetermined search criterion.

The distributed computer system may support the session initiation protocol (SIP), and wherein the user terminal is a SIP registered terminal, the proxy server is a SIP proxy server, and the user is registered at the proxy server with a unique SIP address.

The search result message may be a SIP message which is sent to the user at an address determined by the SIP proxy server to be the current location of the user who requested the search.

The search result SIP message may be sent to a plurality of addresses associated with the user's registered SIP identity.

The search result SIP message may be sent to an address associated with a different user terminal than the user terminal operated by the user to send the search request to the SIP proxy server.

The user terminal may be a mobile device.

The set of user preferences may comprise a formatting user preference which indicates how the search result should be formatted.

The set of user preferences may comprise a plurality of formatting user preferences, each formatting user preference being associated with a type of user terminal.

The method of the first or second aspects may further comprise the step of the proxy server modifying the set of at least one search criterion according to said set of user preferences.

At least one user preference may indicate a scheme to which the user has subscribed which may modify the cost of an item returned by the search.

The method according to the first or second aspects may further comprise the step of the proxy server modifying the search result according to a set of user preferences.

The proxy server software may modify the search result by modifying the cost of an item returned according to a pricing scheme to which the user has subscribed.

The proxy server software may modify the search result by modifying the cost of an item returned according to a pricing scheme provided by the proxy server software.

The at least one search server to which said search request message is forwarded to by the proxy server may be determined by the proxy server in accordance with said set of at least one user preferences.

The proxy server may modify the search result received to identify an address to which the search request can be forwarded to in the form of an electronic message. For example, an electronic message such as an electronic mail message, a small message service (SMS) message, or a multi-media mobile message, etc.

The proxy server may process the returned search result to remove at least one result which is indicated by at least one user preference as not relevant to the user's listed interests.

The proxy server may process the returned search result to modify any returned cost value for an item indicated by the search according to a discount scheme to which the identity of the user is associated.

The proxy server may process the search result to prioritise the delivery of at least one item listed by the search result to the user in accordance with the extent to which said at least one item conforms with the set of at least one search criterion.

The proxy server may alert the user to a search result by encapsulating the search result in a small message service SMS message which is sent to the user over a communications network.

The search request may be generated by the user terminal modifying a previously stored search request in accordance with an updated set of at least one search criterion.

The set of at least one user preference may specify a maximum time limit for the search results to be generated.

The distributed computer system may be connected over a communications network. For example, a communications network which includes the internet, a PSTN, and which is capable of wireless and/or wireless connections with end terminals.

The session during which software provided on the user terminal interfaces with software provided on the proxy server to send the proxy server the search request

message may be terminated when the proxy server sends the search result message to the user.

A third aspect of the invention seeks to provide a user terminal arranged to be operable by a user for use in generating a search request according to a method aspect of the invention.

A fourth aspect of the invention seeks to provide a proxy server arranged to receive a search request message from a user terminal according to the third aspect, the proxy server being arranged to be used in a method aspect of the invention.

A fifth aspect of the invention seeks to provide a suite of computer programs arranged to implement one or more steps in a method aspect of the invention, the suite of computers being provided on the distributed computer system. The computer programs may be implemented in software and/or hardware.

A sixth aspect of the invention seeks to provide a signal carrying a search request generated by a method aspect of the invention over a communications network comprising the distributed computer system.

A seventh aspect of the invention seeks to provide a signal carrying a search result generated by a method aspect of the invention over a communications network comprising the distributed computer system.

An eighth aspect of the invention seeks to provide a communications network arranged to communicate a signal aspect of the invention.

A ninth aspect of the invention seeks to provide a method of providing an item at a discounted cost to a user over a communication network comprising a distributed computer system, the method comprising performing a search for the item and associated cost information according to any one of claims 1 to 6, wherein the proxy server automatically provides the server software at a site indicated in the search result as able to provide the item requested by the search request with information derived from the user's preferences, the information including: sufficient financial information to

enable the user to purchase the item; sufficient address information to enable the item to be sent to an address designated by the user.

An item to be purchased may be automatically provided with a postal address by the SIP server using user preference information which provides personal information on the user's address. This enables the item purchased to be sent to a postal address.

A ninth aspect of the invention seeks to provide a discount purchase scheme in which a user is provided with an item using a method aspect of the invention, the method further comprising discounting the cost of the item returned by the search by a predetermined amount in accordance with a discount rule determined by the proxy server.

When an item is purchased a user preference may be updated to reflect a predetermined number of points which can be indicated by the user in at least one future search request for an item and associated cost information.

The points indicated by the user preference may generate a discount in the cost of an item indicated by a search result which at least partially conforms with the future search request.

A tenth aspect of the invention seeks to provide a method enabling a user to search for information on the cost of an item on a distributed computer system, the distributed computer system including an end terminal of the user, a proxy server, and at least one information source, the method comprising: generating a search request for the item at the user terminal; modifying the search request to indicate at least one user preference; forwarding the search request from the proxy server, the proxy server being adapted to retrieve data from one or more of said data sources, the proxy server being adapted to process a search result received from a data source and provide additional information to further interrogate a data source identified by said search result to receive a second search result, the proxy server being adapted to provide the second search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

The SIP search software may optimise the purchase of complex items requested by prompting the user for additional parameters which relate to the purchase.

A user may enter a search request and the SIP server modifies the terms in the search request to optimise the purchase price of an item.

The SIP server may provide a notification of the results to a user end terminal and the user increases the bandwidth available to receive a search result following said notification. This enables a user to move into a higher bandwidth environment, such as a hotspot for WI-FI in a wireless lan environment.

Advantageously, a search result could be forwarded by the proxy server to a data source by the proxy server sending an electronic mail message to an electronic mailing list associated with the search result, or by filling out a web page (e.g. for insurance quote) automatically. The data source may not be accessible via another server but could be accessible via instead an IP-PSTN gateway, for example, if the proxy server uses automatic speech generation and recognition technology to phone up a hotel and actually request a price using some conversion means to convert the text version of the search request into a spoken version. The data source may comprises a server and an associated search engine. Advantageously, the invention enables the user to terminate the session with the search server prior to the search results being generated, which enables more complex search requests to be processed.

Advantageously, the invention enables the user to receive search results more rapidly if the result is sufficiently conforming with the user preferences to be determined as a high priority. In this way, the user is provided with more relevant results faster.

Preferably, the user identity is associated with one or more static and/or dynamic addresses. Examples of static/dynamic addresses include – an E164 address (please explain what this is/means), an IP address, a telephone number for a facsimile, a pager number.

Examples of a data source include any source of information which is available via the distributed computer system. The data source is preferably running the special search software (module #3) for greater functionality and better optimisation. In alternative embodiments the data source may comprise a web page.

The search result message may encapsulate the processed search result. Alternatively, the search result message may provide a key to enable a user retrieve the processed search result. For example, an SMS could be sent to alert a user of a particular search result having being obtained and provide the user with a key (e.g. a code or encrypted message) which enables the user to retrieve video from a store. It is envisaged that such "alerts" will be very useful where a search result indicates a file has been located as it would enable the user to connect to the proxy server using a suitable bandwidth connection.

Advantageously, the invention supports SMS messaging to alert users to search results and providing a user with a key to enable the user to retrieve a file via a high bandwidth connection such as a WLAN. For example, if a video clip was located, a user might wish to access this from a WLAN because the file is too big to view/download over a dial-up bandwidth connection.

Advantageously, the invention enables the search process to be performed more efficiently by including additional information provided by the user preferences in the search request and/or using additional information provided by the user preferences to remove less relevant search results which are returned to the enhanced SIP server prior to these results being forwarded to the user. The invention thus enhances the RFC (please defined this) functionality of the server software over the normal search software which a server may have.

Advantageously, the search can be forwarded to the most appropriate user end terminal for the content of the search result.

Advantageously, the search can be forwarded to the user end terminal which the user is operating at the time the search result is forwarded. The SIP proxy server is able to store results which are received when an appropriate user end terminal cannot be

identified as one which is being operated by the user. The SIP proxy server may then modify at least one search result or generate another form of notification to alert the user to the search result and to indicate to the user how the user may retrieve the search result.

Another aspect of the invention seeks to provide a proxy server which is arranged to receive a search request message from a user end terminal aspect of the invention, the proxy server being arranged to be used in a method aspect of the invention.

The preferred features of the invention as set out by accompanying the dependent claims may be combined with any of the aspects of the invention as set out by the independent claims in any manner which is apparent to those skilled in the art.

Specific embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 shows schematically a SIP-supported data retrieval system according to an embodiment of the invention;

Figure 2 is a flowchart showing schematically steps in a method of searching for data according to an embodiment of the invention;

Figure 3 shows steps which occur at an end user end terminal in a method of method of searching for data to be retrieved from a distributed computer system according to an embodiment of the invention;

Figure 4 shows schematically an example of the fields in a SIP header and Search Description Protocol according to the embodiment shown in Figure 3;

Figure 5 shows schematically an embodiment of automatically completing a transaction to secure an item returned by the search result according to another embodiment the invention; and

Figure 6 which shows schematically steps in another embodiment of the invention in which a user is prompted for more information to improve the search process and enable the search results to indicate a price for the item to be purchased.

The best mode of the invention as currently contemplated by the inventor will now be described by means of specific embodiments of the invention.   The best mode of the invention as currently contemplated by the inventors is supported by the session initiation protocol (SIP). SIP is the Internet Engineering Task Force's IETF's standard for multimedia conferencing over IP. SIP is an ASCII-based application-layer control protocol and is defined in RFC 2543, a copy of which is filed herewith and the contents of which are incorporated by reference.

SIP can be used to establish, maintain and terminate calls/sessions between two or more end-points.   More specifically, SIP provides session management within a packet telephony network which provides the ability to control the attributes of an end to end call as well as signalling which enables call information to be carried across network boundaries.   Thus SIP provides the ability to: locate the endpoints via address resolution, name mapping and call redirection; determine the media capability of an end point; determine the availability of an end point; establish a session; handle the transfer and termination of a call; and have an identity associated with one or more address mappings, as is well known in the art and defined by RFC 2543.

Those skilled in the art will recognise that although the invention is described in the context of the SIP protocol as described in RFC 2543, the invention is not limited to the SIP protocol per se but extends to any protocols derived from the SIP protocol which support the SIP functionality used by the invention. For example, the invention can be implemented by any protocol which enables a proxy server to: locate the endpoints via address resolution, name mapping and call redirection; determine the media capability of an end point; determine the availability of an end point; establish a session; handle the transfer and termination of a call; and map an identity to a number of static and/or dynamic addresses, providing the protocol also enables a search session to be given a unique search identity by proxy server search software, and providing the search is been initiated by a user registered with the proxy server and assigned unique user identity having the above properties, and providing the proxy server is able to associate

the user identity with one or more user preferences. These features of the protocol are necessary to enable the proxy server to modify and/or filter the search query as appropriate and to select a user end terminal to forward the results to in an appropriate format.

Referring now to Figure 1 of the accompanying drawings, a distributed computer system over which data can be retrieved using a search method according to the invention is shown. In Figure 1, a SIP-supported data searching system for retrieving data using a distributed computer system according to an embodiment of the invention is shown. The SIP-supported data retrieval system comprises a plurality of devices supported by appropriate software modules enabling the devices to interface with each other over the distributed computer system.

The distributed computer system shown in Figure 1 comprises a communications network which includes at least one user operable end terminal 10, a SIP proxy server 12 and at least one data source 14. The end terminal 10 may comprise any type of device capable of relaying information to the SIP proxy server 12 in the form of a search request. As shown in Figure 1, for example, a personal computer 10a or a mobile phone-type-device-10b-capable-of-connecting-over the communications network to the SIP proxy server 12, which may its self comprise a plurality of components, for example, a central server 12a and a data storage facility 12b, which may for example provide a database of user preferences and/or past search results, or search results which have yet to be communicated to and/or retrieved by a user who has submitted a search request. In certain embodiments of the invention, the SIP proxy server 14 may itself comprise a distributed computer system, for example, the proxy server may retrieve the user preferences from a separate data base storage system via a communications network.

Those skilled in the art will realise that a variety of forms of connection (wireline, wireless, dial-up, broadband ASDL etc, LAN etc connections) are possible and that the end terminal 10 could be a portable device. As the connection need not be permanent an end terminal 10 which sends a search request to the SIP server 12 does not need to remain connected to the SIP server 12 after the search has been sent to the SIP server

12. The invention enables an appropriate end terminal 10 to be located for forwarding a search result to, according to one or more user preferences established by the user and/or by the end terminal software and/or proxy server software. A user end terminal 10, the SIP proxy server 12 and a data source 14 interface with each other either directly or indirectly as appropriate according to specific embodiments of the invention, for example, search results returned by a data source 14 may be sent (if a user preference/search request permits it) directly to an end terminal 10 in one embodiment of the invention.

Referring now more specifically to Figure 1, two end terminals 10a, 10b shown by way of example comprise a personal computer-type 10a and a mobile telephone type device ,10b. End terminals 10a,10b are each capable of being connected independently to other elements in the computer system, i.e., to a the SIP proxy server 12 and to at least one data source 14. It will be appreciated by those skilled in the art that the data source 14 from which or via which information is retrieved does not need to be limited to the specific examples 14a,14b,14c shown in Figure 1. In Figure 1, data source 14a comprises a web server, data source 14b comprises a search engine (or database), and data source 14c comprises a phone terminal.

A plurality of software modules #1, #2 and optionally #3 are provided, components of which may be localised on an individual device or may be distributed across one or more devices. Software module #1 comprises end terminal software (ETS) which runs on the user end terminal 10a and interfaces via SIP user agents with software module # 2 which comprises SIP server software (SSS) run by the SIP proxy server 12.

Software module # 3 is provided optionally at the data source 14. The data source 14 may comprise, for example, a conventional search server or even a phone type device such as 14c in Figure 1, which may not be provided with software module # 3. For example, consider where the proxy server 14 is querying a conventional search engine such as Google™, and where no new software is provided (i.e., if software module #3 is not present on the device queried), for example, the web server 14a in Figure 1.

Although Google™ can be queried in a conventional way, Google may later provide an API (Application Program Interface) which could enable more complex, enhanced or

more efficient SIP searches to take place.   Alternatively, the proxy server 14 could have

processes a returned search result to determine that a specific web-site should be

resent the search request formatted in a specific way, for example a travel web-site for

checking or booking flights. Such a web-site may operate in a SIP-enabled or non-SIP

enabled manner. As an example, in Figure 3, software module # 3 comprises search

database/engine software SDB which runs on the search server (equivalently known as

the search engine) 14b.

The term end terminal 10 as used herein refers to any device suitable for generating a

search request and/or receiving a search result. The user end terminal 10 can comprise

a personal computer type device 10a as shown in Figure 1, however, those skilled in the

art will appreciate that the user end terminal 10 may comprise any device capable of

remotely accessing the search engine and/or displaying search results, for example, a

personal digital assistant type device such as the PalmPilot™, or a mobile telephone

type device 10b such as is shown in Figure 1, which a user can operate.   The end

terminal 10 to which the search result is sent may not be the same end terminal 10

which generated the request.

In one embodiment of the invention, the end terminal 10 which receives the search result

is not capable of generating a search request, but is capable of displaying a search

result (for example, the user end terminal 10b may comprise a mobile phone type device

which does not have sufficient memory capacity to support the generation of a search

request, but which can receive a search result in the form of an small message service

(SMS) text message).

A user of an end terminal 10 is assumed to have set up a SIP identity URI, in the

manner described in RFC 2543 for example, and requests a search by entering an

appropriate search query into an appropriate search application. The search application

can provide any appropriate interface for the user to enter search terms, and it will be

appreciated by those skilled in the art, that whilst a computer type terminal such as is

shown in Figure 1 would support a sophisticated Graphical User Interface, if a search

were to be requested by a less sophisticated device, the user interface can be much

simpler.

Figure 2 shows steps in a method of searching for data to be retrieved from a distributed computer system according to the invention.

In Figure 2, in step 20, a user initiates a SIP search session at an end terminal 10 and generates a search request which will include information on the user's SIP identity. The user's SIP identity could be entered either manually by the user as part of the search request but in the best mode of the invention is generated automatically as a result of the user initiating the SIP search session.

The search request comprises at least one search criterion and is generated using an appropriate search software application adapted to interface with the ETS (end terminal search software module #1). When the search is requested by the user, the search software application passes the search request to the ETS. The ETS software module then modifies the search request according to at least one user preference in step 21.

A user preference used to modify the search result at the end terminal 10 may have been determined in a variety of ways. For example, the user preference may have been either predetermined by the user who has entered a personal profile comprising a set of one or more user preferences (for example, no interest-in-football or strong interest in Bath as a town/place but not as a bathroom item). The ETS software module will have associated such a user preference set with the user's SIP identity. The user preferences may be supplemented or replaced by one or more user preferences which the ETS software module has determined automatically from analysis of the user's historical search activities, i.e., by analysing which search results indicating a web-site resulted in the user visiting the web-site.

The ETS then encapsulates the search request within a SIP message in step 22 of Figure 2 using a search description protocol (SEDP) according to the invention, and sends this to the proxy server.

The proxy server then passes the encapsulated search message to the proxy server software module SSS in step 23 of Figure 2, and the SSS then de-encapsulates the search request to process the request further according to the user preferences in step 24. The further processing of the search request may be based on additional user

preferences which the proxy server has determined, for example, that results from a particular data source have historically resulted in the user being more likely to access the web-sites indicated in the search result, and the proxy server may then generate a user preference for that data source to be accessed again.

Alternatively, the proxy server may have a central scheme for discounting any price which is returned in a search result from particular types of web-sites according to a scheme which the user has subscribed to. The amount of discount may be fixed or vary according to certain conditions. The fact that discounts should be obtained and/or the details of organisations which the user is a member of could be provided as user preferences which are used to modify the search request.

The user preferences which the proxy server has noted may also vary and not be fixed, for example, according to the time the search is generated and according to the priority of the search. For example, the proxy server may note the search is urgent and so will always notify the user immediately a result is received, even if the user preferences forwarded by the ETS indicate a user preference for not notifying immediately). Thus one or more proxy server user preferences may in some embodiments of the invention, override one or more end-terminal user preferences.

The proxy server then processes the search result and forwards it to a data source in the appropriate format in step 25, for example, either as an email or a normal search request to a non-SIP enabled search server such as 12a shown in Figure 1, or even convert the search request to a suitable query and connect to a telephone data source 14c such as Figure 1 shows.

The data source 14 then processes the search request to generate a search result which is conveyed as a search result message to the proxy server 12 in step 26. Depending on the type of data source, the search result may comprise a audio file, for example, if the data source is 14c, the person answering the query may have their answer recorded as a voice-memo and stored in an audio format. The answer may however, be converted at some suitable point using speech to text technology to a text file, and the search result would then have a more conventional format.

The user may have set up a preference to convey an indication with the search request that search results should be sent directly to the user's end terminal in some embodiments of the invention. For example, if the request is very urgent or if the user has a preference set up that results returned in email format should be forwarded directly to the user's mail server and not returned for further processing by the proxy server. This direct return of the search results option is not indicated in Figure 2, as in general the search results will be processed by the SIP server to determine an appropriate location for the results to be stored and/or sent to an end terminal.

The proxy server 12 de-encapsulates the search message it containing the search result then processes the search results received, and generates a search result having a format compliant with the user preferences and/or with the end terminal to which the proxy server has determined the results should be sent to in step 27.

Unlike a conventional search request, which may simply return a website where a user must then re-enter additional information if the user generates a search request for "cheap flights to Egypt", the SIP proxy server 12 is able to process the search result to enable further interrogation of a data source to determine more relevant search details. This further interrogation may be enabled either by the initial processing performed in step 24 of Figure 2, or as part of an iteration of the search process steps 24 to 26 performed within the processing performed in step 27 in Figure 2, prior to delivering this to the user end terminal.

As an example, if data source 14a returned a URL for a web-site for a travel company that has an on-line booking system, the SIP proxy server may already be aware of the format the on-line booking system would require to find out specific details of flights and would then provide information to enable the booking system form to be effectively filled in. Alternatively, the SIP server may interrogate the booking system to determine the information required. Once the SIP server has obtained a specific result which conforms with the user's search request to the level required (i.e., specific flight information has been obtained), the SIP server forwards this information as a search result to the user. If the SIP server is aware that the user has frequent flyer miles or is a participant in another discount scheme (either as an individual, or if some organisation the user is a member (and which is recorded in his user preferences) has a discount scheme), this

information might also be submitted by the SIP server, so that the user is also given information on the price of a flight which takes his frequent flyer miles into account. In this way, the search results returned by the SIP server are much more relevant to the user. In a similar manner, car insurance sites, theatre ticket sites, etc., and all be further interrogated to get specific information relevant to the user's initial search enquiry.

The method of encapsulating the search within a SIP message is performed using any suitable search description protocol (SEDP) which can be devised to provide a structure to the search request generated by the user at the end terminal 10. For example, in one embodiment of the invention, the SEDP provides a structured search request format which includes fields to indicate a set of search characteristics. The search characteristics provided indicate the type of search and a range of at least one search criterion, and may optionally include one or more user preferences. The one or more user preferences can be generated by the end terminal SIP software module #1 or by the proxy server software.

Figure 4 shows an example of a SEDP, and is described in more detail later on, but in general a an search description protocol according to the invention will support one or more of the following characteristics:

Security (encryption);
User SIP id;
a variety of search descriptions fields (eg XML/free text/keyword selection);
information on current session context (what user has been doing eg Email, how long connected, how long on current IP address,....); and
information on cached recent searches on terminal (eg large files might be held on the terminal and should not be sent again).

Those skilled in the art will appreciate that Figure 4 shows only some features of a search description protocol SEDP according to the invention and another protocol which is able to encapsulate the search request within the SIP message could be implemented instead. The essential feature is that any search description protocol needs convey at least the search request information and the user's SIP identity universal resource indicator (URI). In one embodiment of the invention, the ETS may be configured to format the search string the user has entered so that this conforms with a more efficient

search expression. In another embodiment of the invention, the ETS may cache one or more previous searches. This enables the ETS to add updated information to a cached search to facilitate the search request process.

Returning to Figure 1, a user terminal generates a search request which is encapsulated by the end terminal SIP software. The encapsulated SIP message is then transmitted from the user end terminal to a SIP proxy server 12 with which the user has registered the user end terminal as a SIP terminal 10. The SIP proxy server 12 may have several registered user end terminals which the SIP proxy server is able to determine are associated with a particular user SIP identity.

When the SIP proxy server 12 receives the encapsulated SIP message, the server forwards the encapsulated message to the SIP proxy server software module #2 SSS. The SSS software module then processes the received message to de-encapsulate it. The SSS software module then analyses the search request in accordance with a predetermined set of search rules which are configured by the SSS and which may be determined at least in part by at least one user preference which the SSS is able to associate with the user's SIP identity URI.

In one embodiment, the SSS software module may further modify the search expression and/or select specific servers within the distributed computer system to forward the search expression to according to the user preferences associated with the user's SIP identity URI.

The search is modified in accordance with any specific user preferences. The user preferences which are used to modify the search may be a subset of the total user preferences which are available, and the SIP proxy server 12 may select the user preferences to be used to modify the search by analysing the search request and determining which user preferences are appropriate to the search. For example, the SIP proxy server 12 may select a user preference to indicate search results should be sent to home if they relate to a leisure activity and to work if they relate say to financial items, so that the user preference for which end terminal results should be sent to is selected according to the type of content which the user has requested. By incorporating user preferences, the SIP proxy server software can perform certain additional steps to

ensure any personal preference information associated with the user's SIP identity is incorporated into the search request as a supplementary search expression, or use the users personal details to perform a supplementary search to obtain more relevant results, or even purchase an item located by a search.

For example, the SIP proxy server 12a may access database 12b to retrieve a set of at least one user preferences which are associated the user's SIP identity, such as the user's hobbies, the user's search preferences, the user's past search results, the user's past user actions after search results, and the user's most frequently accessed web pages. These user preferences are then used to reconfigure the search request. The user preference information could be used by the SIP server to add supplementary search expressions which include negative search criteria. For example, a user preference to indicate that unless expressly entered as a key word, no results should refer to a specific keyword should be included. In this way, a user can set a user preference for a keyword such as "Football" to not feature in any search results. The SIP server then can modify received search requests to automatically include in the search expression information equivalent to the boolean expression "AND NOT football". The modified search expression then results in search results being returned to the user which exclude football-related information. This is advantageous as if the user's preferences indicate the user wishes to exclude search results for football related sites when a search is being performed over a communications information network such as the World Wide Web on the Internet, a search for "Manchester" for example, would not result in search results being forwarded to the user which referred to "Manchester city" or "Manchester United" or any other football related site which mentioned "Manchester".

The user's preferences may include search site preferences which would indicate one or more search sites are to be included (and/or excluded search sites) in the search, a maximum search time for the search to be active, and search result terminal and/or result formatting information.

The SIP server 12 then selects a number of search engine/server/sits in further SIP messages. The further SIP messages may be encapsulated or may not be according to whichever form is most suitable for the specific server being queried. For example, some messages could use a new protocol if a server was equipped with an appropriate

search interface – API) between the SSS and SDB. The protocol would need to have one or more (ideally all of the following features):

be secure (e.g. the protocol might use Ipsec);

provide authentication – for example, the protocol might require authentication of servers (to check for Fakes);

support compression (of the query and/or of the result); and

allow caching on the SIP proxy ideally (at a very high level, for example, if a highly popular football team scored a goal and the number of users who may search for a video clip of this to download could reach as high as 10 million, however, the SIP server would only need to retrieve this video clip once !).

More than one protocol could be utilised to transport the SIP messages, for example, if a SIP Proxy server needs to provide queries in a number of ways, for example, the server could send a normal email to a mailing list requesting more information on the search expression (or an expression derived from the search expression), or even (using a suitable automatic voice generation application) phone a hotel, or fill out a Web form (all of which forms of further querying use different transport protocols).

As an example, in a typical query message according to the invention, the following information could be provided:

Origin IP address:123.32.123.001

Origin URI :name.surnameofuser@atelco.com

Hash:4387t84gf8t4f84tg83rtf8p32yh239f8y[98fy9[8747643865gffgyfrjylegfgv,ueg yvjgvy

Search reference: 653467252

Search terminal type = Pentium III PC

Account type: Individual

Average internet access activity duration: 2 hours

Previous Activity: email

Location of terminal: Ipswich, England

Request type: TRAVEL

Request: Date 23/1/04;

From: Stansted;

To Moscow;

Time: unspec;

Cost CHEAPEST;

Return No

End ReqType

Return:: Instant(123.32.123.001), update (day, Mobile- name.surnameof

user@atelco.com)

Cost – Bill 1

END

Each search is assigned a unique search number by the SIP proxy server 12 so that the SIP server 12 is able to match any replies to the original search request even if the user is not longer in communication with the SIP proxy server 12 via the user end terminal 10.

When the SIP message carrying the search request is received by a data source 14, typically an information source such as a search server 14b, the message contents are extracted and are processed by the appropriate SIP software module located on the other server, e.g. the search engine SDB software module #3 located on the search engine of a search server. Alternatively, if the SIP server chooses another transport protocol, the message contents may be processed in the normal way (eg Web form) for the site queried, for example, as would happen if a conventional search engine (i.e., non SIP enabled) were queried by the SIP proxy server 14. ,Also, if a SIP server 14 forwards the search request to a data source such as a mailing list or email address for a particular body or organisation of interest regarding the search request (whose addresses may have been located by earlier search requests by the user or provided by a preliminary search result generated by a conventional or SIP search engine), the data source will not be SIP enabled.

When a search request message is received by a data source 14 , if the data source 14 determines one or more results to the search criterion/criteria set by the user's search request, the data source will forward the search results in an appropriate manner to the SIP proxy server. Where a SIP server 14 has actually telephoned a number and announced the search using text-to-speech technology, the person who responds to the search may be given a number to contact and a password so that they can respond later to the query. When the person dials the number, they may be presented with the option

of entering the code, and then be allowed to record a message. The message can then be associated with the SIP identity of the user and the search identity using the code entered. This then enables the message to be forwarded to the SIP server which might convert the audio file to a text file using speech-to-text technology, or forward the file to the user as a search result for the user to play on their machine. A similar process is undertaken where the SIP search message is forwarded to an email or mailing list address so that any response can be identified by the SIP proxy server with the user's SIP URI (or key to get information at a later point in time (see the description above).

When a SIP enabled search engine 14b encapsulates one or more results in a SIP message together with the unique search number and forwards this to the SIP server, this enables the SIP proxy server 12 to associate the search result with the SIP identity of the user who requested the search.

When the SIP proxy server 12 receives a SIP message it extracts the search result and search number. The SIP proxy server 12 associates the search result with the SIP identity of the user who requested the search. The SIP proxy server search software module # 2 SSS may store results for a specific search number according to the set of user preferences for a predetermined period of time or until a specific number of positive search results are received. Null search results can be forwarded by the SIP proxy server to the user and/or near matches provided in accordance with the user's preferences.

The SSS software module then determines the user's current location (as located in the SIP location database), the user's terminal type at that location and format (determined in accordance with the user preferences). For example, if the user does not wish to receive the search results until a certain time, or does not wish to be disturbed, if this information is recorded on the SIP database of SIP user preferences, then the SIP proxy server is able to process the search results appropriately and format the results for the appropriate terminal display.

The user may also specify more than one location for results to be sent to, for example, a short descriptive form (for example, just a town if the user has search for a company's location) may be sent to the user's mobile phone, which could alert the user to log into

their personal computer (to which the SIP proxy server software would have sent a SIP message which encapsulated the full address of the firm as a search result).

As SIP associates currently valid addresses with a SIP user ID, and uses these to deliver the search results there is not need for a user to retain an open search session with the search engine whilst the search is being performed. The search can use permanent SIP addresses which enables results to be collated and a user is therefore also able to specify if, for example, they wanted results to be returned collected into 10 "hits" until the search time has expired, after which any remaining searches should be sent to the user.

As the user is able to designate the terminal and format the search results are to be provided by, it will be appreciated by those skilled in the art that the search results could be provided in form which is accessible when the user next runs the search software module #1 search application, or alternatively be sent in the form of an electronic mail message (e-mail message) or short message service (SMS) message.

As the protocol user identity associated with the user, for example, the SIP URI name.surnameoftheuser@atelco.com, is permanent, this can be associated with a number of addresses/phone numbers which may be static or dynamic, for example, with telephone number such as 01234 123 456 or an address such as 111.223.123.011...)

Another aspect of the invention relates to a distributed search environment in which the SIP proxy server search software module #2 determines the capabilities/specialities of one or more search engines/servers within the distributed computer system. For example, this could be achieved by sending a request for information to the search engines/server, but other mechanisms which can be used include web crawling (for example, such as Google™ implements) or by being sent advertisements, or any other way in which it is possible for the proxy server to discover their capabilities/specialities. The search software running on these machines uses another protocol (Search Capability Protocol CCP) to describe their capabilities (for example, speed, data bases searched, the type of files searched (e.g. *.doc, or *. pdf file names), etc. to the SIP proxy server 14. The SIP proxy server 14 is then able to determine which search

engine is most suitable for a user and/or a specific search requested by the user, for example, by considering the search request, user preferences.

Example 1.

A specific embodiment of the invention will now be described by way of example with reference to Figures 1 and 2 of the accompanying drawings.

Consider a user who wishes to locate information on trams. The user has a history of accessing many tram and transport related web-sites on the Internet, has transactions which record the purchase of model trams, and is listed on at least one transport enthusiast email list.

The SIP proxy server has recorded this information in association with the user's SIP identity and the user is assumed to have set their preferences to indicate that they are interested in transport. Accordingly, both the ETS software module and the SSS software module will record this information as if the user has used SIP for all of their sessions, including browsing, email and Instant messaging, all the information built up about the user's information sources and preferences will be accumulated in association with the user's SIP URI identifier for example users.name@businessname.sip.

Repeated use by the user of the information retrieval search system according to the invention will result in the user having activated (for example by clicking on a highlighted URL returned with the search results) features which fall into the set (site type = museum, request = information,...etc) and this information will be stored on the SSS. Other data mining of the user's previous sessions can also be used to optimise the search to suit the user's preferences.

Consider the user has the specific request of wishing to restore an old tramcar and so the user enters the search phrase "tram, restoration, projects, buy" in step 20 of Figure 2. The user may naturally supplement these search terms with appropriate Boolean operators and wild card characters etc, however, a simple key word such is given here as an example with the implicit assumption the key words are separated by commas and link by an inherent "AND" so that all the key words must be present before the search results are returned.

The ETS software then parses the search request to indicate additional information which is accessible to the ETS software in step 21 of Figure 2, for example:

Search terminal type = Pentium III PC

Account type: Individual

Average internet access activity duration: 2 hours

Previous Activity: email

Location of terminal: Ipswich, England

...

This request is then packaged, using the Search Description Protocol, in a standard SIP message in the manner described in RFC 2543 and transmitted along a communications link to the SIP proxy server 12 in step 23 of Figure 2.

The SIP proxy server 12 then passes the (unopened, i.e., still encapsulated) message to the SSS in step 24 of Figure 2. The SSS is an "intelligent module" capable of making requests to a large number of databases and specific sites or search engines (some but not all of which may have SDB software modules). As an example, the SSS can send the request to one or more of a plurality of different information forums, for example:

i)   the SSS can send a request to a news group on trams in the form of a request for information which the SIP server automatically generates;

ii)   the SSS can send the request to a transport web-site that logs potential projects and restorers (and tries to match the two) which has SDB software which enables the two software modules to create a user entry (as the user might need screening from replies this might be to an email account: 876462965@atelco.com which is created just for this search entry alone, and which would therefore screen the user from spam email which might otherwise be generated if the user's normal email address was given);

iii)   the SSS can send the request to a standard search engine such as Google™ (www.google.com or www.google.co.uk) from which the SSS is able to request a specific number of results, for example, 1000

responses. The SSS then filters the responses provided by the
conventional search engine to ensure that the search results conform with
the user preferences the SSS is aware of for the SIP user identity which
requested the search. The SSS can further interrogate the user if the
SSS detects that ambiguous results are being generated (for example, by
using a built in statistic/pattern matching program the user could be asked
"Do you mean you want to BUY a TRAM?"). The SSS can then
incorporate the user's response to such a further query to refine the
search terms the SSS uses to interrogate standard search engines;

iv)   the SSS can send the request via email to one or more other individuals
        or mailing lists who/which the SSS is able to determine have associated
        with trams as a subject matter of interest; and

v)   the SSS can send a request via email to a museum such as the national
        transport museum.

Example 2

Figure 3 shows in more detail steps in the process of generating search request at the
user's end terminal. In Figure 3, in step 30 a user initiates a search session at the user
terminal, for example, using either text or speech (and a suitable application to generate
text from the spoken search request). The ETS parses the search request to identify a
possible pro-forma it is aware of for that type of enquiry in step 31, for example, if the
search has a travel or financial aspect. This enables direct interrogation of web-sites
such as travel sites, and may remove additional processing of search requests/results by
the proxy server such as were described in the context of step 27 in Figure 2. If
additional information is needed, the ETS may request this of the user and if the ETS
detects a mistake, then it may query this with the user. In the context of a travel enquiry,
the ETS may provide the user with a generic form which requests departure dates, cost
preference etc, and if the departure date is before the arrival date detect this as a
mistake.

The ETS checks to see if previous searches have been performed in step 33. For
example, the user may have requested the same information a few days earlier, in which
case the generic form may be presented to the user with appropriate information already
completed, or the ETS may alternatively have cached some search results. If a similar

search has been recently performed and is held in cache on either the end terminal or on a server such as the proxy server 12, then only an update needs to be sent to the user.

The ETS then formats the search request in step 34, for example, the travel search request may have a pre-set "destination, time, departure point, time" field format.

The ETS then encrypts the search request with a session key in step 35, which was established when the user authenticates at the start of the association of the address of the end terminal and the SID id.

The ETS then places the encrypted payload in a SIP message with TYPE set at SEDP (the search description protocol) in step 36.

The ETS then sends the SIP message to the proxy server in step 37.

Figure 4 provides an example showing the format of a SIP header and SEDP search description according to an embodiment of the invention.

The SIP header includes at least the following information:

i)   INVITE sip:search@bt.co.uk SIP/2.0 – this indicates the SIP header relates to the invitation from the SIP server to a search engine

ii)   VIA: SIP/2.0/UDP spainltel:5060;

iii)   From: Joe Bloggs<sip:joe@atelco.net> - this is the SIP URI of the user;

iv)   To: Search <sip: search@uk.net> - this provides the SIP URI of the search service;

v)   Call-ID: 10000001@sipsteme.net – this is the call of the SIP session, which can terminate early before the search result is returned;

vi)   Cseq: 1 INVITE – this is the sequence number of the SIP call;

vii)   Subject: Urgent Search – this could be a plain text entry or provided as a field which an end point uses;

viii)   Contact: Joe Bloggs <sip: joe@atelco.net>

Additional fields which the invention provides in the SIP header indicate the SIP payload, and include:

ix)   Content-Type: application/SEDP – the type could be used to send an IP address, but in general is used to indicate that instead of a MIME type application, the application is a session description protocol according to the invention, SEDP (SEarch Description Protocol);

x)   Content-Length: 160 – this indicates the size of the payload, the number 160 is given by way of example only.

Figure 4 also indicates a SEDP according to an embodiment of the invention where a travel enquiry forms the body of the search expression. As shown in Figure 4, the SEDP comprises the following:

i)   Type: travel.air – the type field indicates a specific search field where appropriate;

ii)   F= Luton; 13,4,04; d = Ulan Botar; 28,4,04; ; ; - these fields indicate the point of departure is Luton, the departure date is 13 April 2004, the destination is Ulan Botar and the return data is 28 April 2004, followed by a number of null fields.

iii)   AP = British A, NOT Aeroflot, other – these are user preferences which indicate positive preferences (British Airways) and a dislike (Aeroflot)

iv)   P = Price – this field is being used to indicate that price is a priority feature of the search

v)   U = instant; update (phone1)- this field is being used to indicate that the search results should be communicated to the user end terminal indicated by phone 1 instantly when they arrive.

vi)   T = urgent – this gives the priority of the search;

vii) . OS = Hotel, Car Hire, Insurance – these are other services which are relevant given the category of the search, so the proxy server may wish to report information on these services if they are returned by a data source;

ix)   Sid = 7684^^*jjkkj84 – this is the ETS session identifier which resides above the SIP id, and which may or may not be associated with SIP.

Fields ix) and x) in the SIP header (and so also all the fields in the SEDP search description in the payload) may be encrypted in some embodiments of the invention, as indicated in the steps outlined in Figure 3 of the accompanying drawings.

Example 3

Figure 5 shows an very specific embodiment of the invention in which a user indicates they want a hotel room in a specific location (for example Salzburg) for a specific duration (for example 2 nights) at a specific cost (under £30 a night) in a search request in step 50.

In step 51, the ETS passes the search request and asks for more information, for example, the number of people, the exact location, and type of room, and a start date.

In step 52, the ETS forwards the message to the SIP proxy server whose SIP search server software SSS then processes the message (having de-encapsulated it).

In Step 53, the SSS sends an initial search to several travel search sites, some of which have enhanced SIP search interfaces but some of which may be standard world-wide web WWW servers.

In Step 54, the results returned are negative as the price cannot be met. The proxy server then may ask the user for more information or to revise the search and/or ask if the duration of the search could be extended so that search results could be returned at a later point, for example, 1 day later. In Figure 5, the user sends a response to the SIP server that it is possible to perform an extended search and for results to be provided 1 day later. The SSS then searches for hotels which do not have on-line booking facilities to determine email addresses and/or telephone numbers on travel web-sites and tourist information sites.

In Step 55, the SSS sends out email enquires in a format generated from the search request, and phones up hotels using text-speech and speech-to-text converters. The SSS obtains a near result and noting that the user is a member of at least one potentially

relevant organisation, provides this additional information to the hotel providing the near result to obtain a discount, for example 10%.

In step 56, the SSS checks the user's location database and determines that an SMS would be most appropriate (for example, the SSS may recognise that the time is outside the usual range of hours a user operates their computer at home or work). The SMS informs the user that a room has been found which meets all of the search requirements and asks the user if the booking should be automatically completed. This option is possible as the user has already registered bank account/credit card details to enable automatic purchasing and may have set a user preference to indicate that automatic purchasing should be enabled. In other embodiments, the user may set a user preference to indicate that if all criteria are met, the purchase should proceed automatically without a prompt.

In step 57 of Figure 5, the SSS books the room by providing the financial information to the hotel either by email or by fax and informs the user that this has been done. In Figure 5, the SSS waits until a confirmation number has been received from the hotel and then forwards this by SMS to the user. Alternatively, the SSS could notify the user as soon as the financial details have been sent to the hotel, or have been indicated as having been received by the hotel (for example, in the case of an email being sent when a receipt for reading is received or in the case of a fax, when the fax is confirmed as successful).

As has been mentioned above with reference to specific embodiments of the invention, it is a feature of the invention that both the end terminal software ETS and the SIP proxy server software SSS is arranged to modify a specific search expression (i.e., the phrase entered by the user on the end terminal) so that any requests for information which generated by the SIP automatically have an appropriate format for the destination to which the search request message is to be forwarded to.

The responses from these searches can be generated over several different timescales, ranging from virtually instantaneous for the conventional search engine results to several days, weeks, months or even years for the emailed requests for information. A user is able to indicate either in the search expression or as a user preference (which may be

derived from the search expression), the maximum duration a search may be conducted for. This could be implemented by indicating to the proxy server 14 a cut-off time after which search results returned should be discarded. Search results which are returned to the proxy server 14 after the initial search session has terminated can be processed as the SSS is able to associate the results with the original request using the unique search identifier associated with each search (which can be given in a form such as 1234567@aserver.telco.umts)which is issued by the SSS. The SSS is then able to process response and may iterate the search procedure to obtain additional information as the search results arrive by processing the results before the results are notified to the user.

The form of the results and the mechanism by which the user receives the results can all be set by user preferences. Typically, the user might indicate that results should be provided in one or more of the following forms:

i)   as a weekly summary of responses;

ii)   as an instant reply (within 1 minute);

iii)   only best match answers should be sent via email as high priority.

The user might always indicate that the search should be cancelled at any time, and this too can be easily accomplished as the SIP search number uniquely identifies the search. The user may also

The SSS can use the facilities of the SIP proxy server and its associated location database to locate the user at any given time (since the user's IP address is not a reliable location after several minutes or hours). The location database returns the users current terminal type and the SSS is able to adapt the response to suit the user's current terminal. As an example, consider if a tram enthusiast responds to a news group item that he has a 1933 GEC/Norwich tram in his back garden in Felixstowe. The SSS is able to determine that the sender of the email is at a user end terminal located in Felixstowe, and the SSS is able to determine the distance to Ipswich is sufficiently close (by accessing an appropriate application/database) to rank highly favourably with the user in view of the user having set a user preference that results from locations within a 20 mile radius are to be given high priority. The SSS then locates the user as being

mobile and so formats the result in the form of an SMS message to the user on his mobile phone.

The SIP server is able to assess the priority of a result according to its conformance with the user's predefined set of user preferences. If the SIP server considers the result to be urgent (which could occur either because the user designated the search as being urgent or because the user indicated that if the search result indicated a close location, or a cheap price etc) then the SIP server delivers the results to the user immediately (or within a timescale the user has given in his set of user preferences for urgent results to be delivered in) in the format the user has given in the set of user preferences. For example, an urgent search result could be set either to a user at his computer terminal if the user is currently logged on to the network at that terminal with his SIP identity, and/or (depending on the user preferences) the search results could be sent via an SMS or automatically generated vocal message to the user's mobile phone.

The user is able to generate a search query and set the user preferences indicate if results should be given in any format including audio. By providing search results in an audible format, persons who are visually impaired are able to receive search results in a more user-friendly manner. It is possible for persons who are visually impaired to set their ETS software user preferences so that it generates a verbal confirmation of the search string they have entered (or to repeat a spoken search request if such a mode of search request generation has been used).

User preferences could be associated by the SIP server SSS software module with the senders SIP URI so that the search results are sent to a destination user end terminal based on the search content (for example, video files could be sent to the user's work email address if this had a higher bandwidth connection to the internet than the user's home terminal equipment instead of the user's home email address). Alternatively, the SIP SSS software could be configured by the user preferences to automatically compress the search results to a predetermine bandwidth, for example, by sending still clips of a video file to one location and the full video file to another location. Alternatively, the SIP SSS software could simply notify the user that a large file was located by the search and store the large file on the SIP server for a predetermined amount of time until the user downloads the file.

For added security such centrally stored files may only be accessible if the user further enters a security key which the SIP server 12 could send either with the original notification that the file has been located and/or the address where the file could be accessed or via a separate notification. The SIP server does not need to use message type notifications such as vocal messages, email or SMS to notify a user of a search result. Instead, the SIP server may deposit a file containing the search results in the user's public drop file etc.

@If the user has requests a search to locate an item for purchase, the SIP server could be provided with the user's financial information such as their credit card numbers etc. and any other information needed to make an automatic purchase of the requested item if the price conforms with the user's set preferences. As an example, consider a SIP server which polled a flight or holiday site for example, and located for example, a return flight to Cairo on the outward and inward dates the user has requested at a specific price. If the price is, for example, either below the user's "immediate purchase" limit or is the cheapest price of a set of search results returned within a given period of time for searching, the SIP server may effect an immediate purchase of the flight so that the price information is correct and the price does not change by the time the user receives the search results. It will be obvious to those skilled in the art that such an automated purchase scheme is not limited to the purchase of airline flights, but could be extended to any item or service offered for sale over a distributed computer system, including items which are under auction but which have an immediate purchase option.

As the proxy server is able to intelligently query certain locations which it believes would be more appropriate for the user's search query, the proxy server can return results which indicate a preferential arrangement with the site providing the search result. This is particularly so if a price is associated with the search query. For example, the search engines which the proxy server access could be configured to always provide a certain predetermined discount (which may be fixed or only temporary in duration). A SIP server search service can then be provided to users whose user preferences indicate they have subscribed to a specific group or body.

For example, if a user indicated they were a member of the Automobile Association and also a civil servant, and the user requested a search for the cheapest insurance for an "S-reg" Volkswagen Punto with ten years no claims bonus, the SIP server could provide this additional member information to the servers of the insurance companies it contacts and the results returned could indicate if an insurance company is able to offer an additional discount to the user based on the organisations indicated in the user preferences.

Alternatively, if may be that the Internet Service Provider (or equivalent body) that the user has subscribed to has discounts with certain third parties such as hotels, software providers, etc., and so the SIP server itself is configured by the Internet Service Provider to offer one or more discounts to the user when it returns a result from the third parties to the user.

The SIP server could keep track of the purchases the user makes with certain bodies and assign one or more points to the user according to the amount and/or number of purchases made, which could be reset within certain timescales. These "points" could then be spent by the user, for example, to get a certain discount off a returned search price or to get an item for free if the search returns a price for that item which could be bought outright with the "points" the user has. In this way, a "reward" scheme similar to the reward schemes currently offered by many chain store retailers can be offered to the user via the SIP search mechanism, whereby each item purchased attracts points and a user is able to purchase further items and/or discounts off other items with the points they accumulate.

Those skilled in the art will appreciate that the spirit and scope of the invention is not limited to the specific embodiments described herein above but instead is defined by the accompanying claims. In particular, the SIP proxy server 14 may itself comprise a distributed computer system, for example, the proxy server may retrieve the user preferences from a separate data base storage system.

An embodiment of the invention involving a SIP search mediated purchase may involve user preferences which are associated with another person apart from the user themselves, for example, a friend or family member. For example, consider where a

user wishes to search for an entertainment venue such as, for example, if a birthday party for a young child is to be arranged. A user may enter the key words "child's party venue" and find search results based on their own preferences. However, if for a family member the user may enter "daughter's 7th birthday party". The ETS recognises the term "party" and provides the user with a set form modified to take into account certain personal preferences which are associated with the user's daughter. In this way, the ETS may bias the results provided to favour those which reflect the user's daughter's known interests, e.g. a children's book character etc.

As an example, the ETS may prompt the use to provide one or more of the following information items in the search expression:
PARTY - (Anniversary, Wedding, Birthday...)
LOCATION (Postcode, MAP....)
Number of Guests..
Age of guests
Entertainment (Band, Puppets ... options given depend on age/type of party..)
Date(s) date with alternatives
Food (Buffet, burgers, cold....)
transport (Bu, Limo...)

Once these details have been provided, the ETS encapsulates the data provided and sends it to the SIP server. The SIP server analyses the component expressions returned for each data entry by the user and might search on each. In this way, the SIP server can seek out suitable venues using an initial search process and then perform a more complex SIP search which could include:
Filling in web forms - eg for hotels
Searching list of local entertainers (eg in yellow pages) and contacting them appropriately by phone/email etc.

Of the search results obtained, some may be provided immediately to the user, eg Hotel Fawlty Towers can

provide a complete package. Later further "packages" - put together by the search engine - could be sent (by a pre-set time) - with notification to SMS as usual

In addition the search software could explore if a better fit (with the original search request plus user references) can be made by slight changes to the date/location. This could provide a cheaper better venue but perhaps slightly further away.

Example 2 - Spare part for classic car

Consider where the user wants to buy a specific part, e.g. a petrol pump, for an specific car, e.g. the Alfa GT Junior 1600 1972. The ETS packages the search request and sends it to server. The proxy server knows Alfa parts suppliers already (for example, the proxy server may have built up a database of such common enquiries because car parts are common enough to crawl the web at night for and cache URLs). However, if the SIP proxy server sends a search request containing these specific details and receives a response that none of the suppliers it has already details of can provide this part the SIP proxy server may notify the user that the search may take longer than initially expected. The SIP proxy server may then initiate a full search, resulting in a search engine trawling the web to locate, for example, 2nd hand part suppliers. This result could be returned to the SIP proxy server which may then further interrogate the resulting part suppliers via a suitable medium such as an email request. The Email request may ask for information to be provided in a specific format. The information is then sent to the proxy server in the designated format which enables the SIP proxy server to extract certain information from it. For example, the SIP proxy server could receive a reply which asks if pump is Webber or Morelli. Search engine would not know how to process such a response and so forwards it to the user, for example, by an SMS notification which contains the enquiry. The User may reply he doesn't know how to tell the difference. The proxy server would then process this response by asking this question to an Alfa news group. The proxy server could then forward responses received to the user who may now response with the appropriate level of detail. The proxy server may now forward this response to a search engine which now sends the full request to the news group used as well as the identified supplier, together with details of a user preference such as the

users information of his membership of Alfa owners club to ensure the user is quoted a price which includes a 10% discount. The response may be passed on to the user who may select for the proxy server to complete the transaction if this can be done electronically on-line over the internet. Alternatively, if the best price supplier does not accept electronic payment, the search engine could forward this information with the price quoted and generate an alert to indicate this method of payment is not available. Alternatively, the proxy server could process the information and trigger an alert to search for more information about the supplier on the internet. If the results indicate the supplier is a very small dealer and no information about the company is available, the proxy server or search engine may indicate that cheque is not a suitable form for payment and instead set up a third party escrow account to hold money (for example via trusted escrow) and then broker deal. If a week later the replacement water pump then fails and the user wants to repeat the process, the SIP server can use the results from the previous search to repeat the process.

Figure 6 shows another embodiment of the invention in which a user wishes to purchase some insurance for a motor vehicle. In the specific embodiment shown in Figure 6, the user preferences are the preferences of the person performing the search, however, it is possible for preferences associated with a key word such as "boss" or another person's name "Joe Bloggs" may be provided where a person such as a personal assistant wanted to locate specific information for another person.

In Figure 6, in step 60 a user makes request to buy insurance for a vehicle. In step 61, the ETS recognises from the search expression the user has entered that a standard type of purchase search is being requested. The ETS may be able to recognise the type of search by using the certain key words which indicate more popular searches to retrieve a form requesting more information for such searches. The ETS may then provide the user with such a standard form (car, age, garage?...)and the ETS could then corrects any mistakes and adds any relevant information (eg AA member, also has second car (classic) which the ETS is aware from the user's stored preferences) in step 61.

In step 62, the ETS encrypts the expanded search expression into a SIP message which is then sent to the SIP proxy server which passes the message to the proxy server search software SSS.

The proxy server search software SSS consults a number of information sources by: filling out web forms, text to speech calls, emails, etc, using user preferences either provided by the ETS or stored at the proxy server and local information which is specific to the search (step 63).

Step 64 - the results come back at different times, each search result being updated to indicate if the optimum result located so far. For a purchase search the optimum criterion will be price unless the user has set a user preference or entered a key word to indicate another overriding optimum criterion. The user is then informed of the cheapest(headline rate) by SMS over (say) next week and sent a key (e.g. a url) to get the full details (Restrictions, excess...)(step 64).

Step 65 indicates how a user can buy automatically by informing the SIP Search Engine at the proxy server to send his credit card and address details to a specific insurance company whose address details have been located by the search and which the search has indicated as providing insurance at a specific cost which takes into account the fact that the user is a member of certain motoring organisations. The insurance company might request proof of no claims and the search engine might send back his old policy number automatically (step 66).

The proxy server may also be able to interrogate one or more of the insurance web-sites located by the search process to determine that if the user were to join a specific organisation then an additional discount may be available.

In one embodiment of the invention the SIP Search Software modifies the terms in a search expression to optimise the purchase price of an item requested by the search expression. In this way, the SIP search software is able to facilitate the purchase of complex items in which a number of parameters can determine the purchase price. The user may indicate such terms can be varied by pre-pending or appending a symbol to the search term that the SIP search software will recognise as indicating a variable

search parameter (e.g. the date, the number of people at the party, location in the party example) in a way no person would have time to do. Similarly, for travel to a destination, the user may indicate the destination is fixed but one or more of the time, duration of travel and departure date are flexible. The sever might then perform a search which researches the best rates, offers (in a way that a user would never have time to do) and use that to optimise the prices so that the results returned are progressively cheaper. Other examples where the SSS modifies a search to optimise it could include the SSS negotiating to get trade discounts or certain seats for theatre shows.

In another embodiment of the invention, the SSS may operate directly to bulk buy/pre-book popular items (eg London Show tickets) automatically - knowing (from past info and user info on its data base) that it can sell these items to certain users. By exploiting the database of user preference information, the SSS is able to target advertising mail shots to users who would find such items of interest, and so offer particularly good deals at the last minute as the SSS would be aware of the location of users. For example, if a user is in Cardiff, the SSS may know this by the activity reported by the user's mobile terminal, and so advertise tickets for a theatre show in Cardiff that evening. This targeted advertising based on user preferences and knowledge of a user's current whereabouts is highly advantageous.

CLAIMS

1. A method of purchasing an item, the method enabling a user to search for information on the cost of an item on a distributed computer system, the method comprising:

    generating a search request for the item at a user terminal;

    modifying the search request to indicate at least one user preference;

    forwarding the search request to a server adapted to retrieve data from the distributed computer system, the server adapted to provide a search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

2. A method as claimed in claim 1, wherein a user preference includes financial information personal to the user and at least one criteria which a search result must conform which initiates the automatic purchase of the item prior to the user being informed of the search result.

3. A method as claimed in claim 1 or claim 2, in which the search result is provided in a medium and format selected by the user for a user terminal to which the search result is to be forwarded.

4. A method as claimed in claim 3, wherein the user terminal is selected according to the extent to which the search result conforms with the search request.

5. A method of searching for data to be retrieved from a distributed computer system, the data including an item and associated cost information, the distributed computer system comprising at least one user terminal capable of communicating with a proxy server, the proxy server being capable of communicating with at least one other server capable of retrieving information from the distributed computer system, the user terminal being adapted to be operable by a user who is registered with the proxy server with a unique permanent user identity associated with one or more static or dynamic addresses, the user identity being associated with a set of user preferences, the method comprising the steps of:

generating a search request at one of said at least one user terminals, the search request indicating at least one search criterion to be met by the data to be retrieved;

sending a search request message encapsulating the search request to the proxy server;

associating the search request message with a unique search number associated with the user's unique identity;

forwarding the search request message to at least one search server arranged to process the received search request message;

performing a search according to the encapsulated search request;

sending a search result encapsulated in a search result message to the proxy server;

de-encapsulating the search result message;

processing the search result according to the set of user preferences;

selecting one of said at least one user terminals according to the set of user preferences; and

sending an search result message encapsulating the processed search result to said at least one selected user terminal.

6. A method as claimed in claim 5, further including the step of the proxy server purchasing the item at the cost indicated by the search result and modifying the search result to indicate the item has been already purchased, if at least one predetermined user preference indicates personal financial information of the user which enables the purchase transaction to be completed by the proxy server, the proxy server being configured to automatically purchase an item at a designated cost if at least one user preference indicates that an automatic purchase can occur if the search result meets at least one predetermined search criterion.

7. A method as claimed in any previous claim, wherein the distributed computer system supports the session initiation protocol (SIP), and wherein the user terminal is a SIP registered terminal, the proxy server is a SIP proxy server, and the user is registered at the proxy server with a unique SIP address.

8. A method as claimed in claim 7, wherein the search result message is a SIP

message which is sent to the user at an address determined by the SIP proxy server to be the current location of the user who requested the search.

9. A method as claimed in claim 8, wherein the search result SIP message is sent to a plurality of addresses associated with the user's registered SIP identity.

10. A method as claimed in claim 7 or claim 8, wherein the search result SIP message is sent to an address associated with a different user terminal than the user terminal operated by the user to send the search request to the SIP proxy server.

11. A method as claimed in any preceding claim, wherein the user terminal is a mobile device.

12. A method as claimed in any preceding claim, wherein the set of user preferences comprises a formatting user preference which indicates how the search result should be formatted.

13. A method as claimed in any one of claims 1 to 12, wherein the set of user preferences comprises a plurality of formatting user preferences, each formatting user preference being associated with a type of user terminal.

14. A method as claimed in any previous claim, wherein the method further comprises the step of the proxy server modifying the set of at least one search criterion according to said set of user preferences.

15. A method as claimed in any previous claim, wherein at least one user preference indicates a scheme to which the user has subscribed which may modify the cost of an item returned by the search.

16. A method as claimed in any previous claim, wherein the method further comprises the step of the proxy server modifying the search result according to a set of user preferences.

17. A method as claimed in claim 16, wherein the proxy server software modifies the

18. search result by modifying the cost of an item returned according to a pricing scheme to which the user has subscribed.

19. A method as claimed in claim 16, wherein the proxy server software modifies the search result by modifying the cost of an item returned according to a pricing scheme provided by the proxy server software.

20. A method as claimed in any previous claim, wherein the at least one search server to which said search request message is forwarded to by the proxy server is determined by the proxy server in accordance with said set of at least one user preferences.

21. A method as claimed in any previous claim, wherein the proxy server modifies the search result received to identify an address to which the search request can be forwarded to in the form of an electronic email.

22. A method as claimed in any previous claim, wherein the proxy server processes the returned search result to remove at least one result which is indicated by at least one user preference as not relevant to the user's listed interests.

23. A method as claimed in any previous claim, wherein the proxy server processes the returned search result to modify any returned cost value for an item indicated by the search according to a discount scheme to which the identity of the user is associated.

24. A method as claimed in any previous claim, wherein the proxy server processes the search result to prioritise the delivery of at least one item listed by the search result to the user in accordance with the extent to which said at least one item conforms with the set of at least one search criterion.

25. A method as claimed in claim 24, wherein the proxy server alerts the user to a search result by encapsulating the search result in a small message service SMS message which is sent to the user over a communications network.

26. A method as claimed in any previous claim, wherein the search request is generated by the user terminal modifying a previously stored search request in accordance with an updated set of at least one search criterion.

27. A method as claimed in any previous claim, wherein the set of at least one user preferences specifies a maximum time limit for the search results to be generated.

28. A method as claimed in any previous claim, wherein the distributed computer system is connected over a communications network.

29. A method as claimed in any previous claim, wherein the session during which software provided on the user terminal interfaces with software provided on the proxy server to send the proxy server the search request message is terminated when the proxy server sends the search result message to the user.

30. A user terminal arranged to be operable by a user for use in generating a search request according to the method of any of the previous claims.

31. A proxy server arranged to receive a search request message from a user terminal as claimed in claim 30, the proxy server being arranged to be used in a method according to any of claims 1 to 29.

32. A suite of computer programs arranged to implement a method according to any one of claims 1 to 29, the suite of computers being provided on the distributed computer system.

33. A signal carrying a search request generated by a method according to any one of claims 1 to 29 over a communications network comprising the distributed computer system.

34. A signal carrying a search result generated by a method according to any one of claims 1 to 29 over a communications network comprising the distributed computer system.

35. A communications network arranged to communicate a signal according to either claim 33 or claim 34.

36. A method of providing an item at a discounted cost to a user over a communication network comprising a distributed computer system, the method comprising performing a search for the item and associated cost information according to any one of claims 1 to 6, wherein the proxy server automatically provides the server software at a site indicated in the search result as able to provide the item requested by the search request with information derived from the user's preferences, the information including:

    sufficient financial information to enable the user to purchase the item;
    sufficient address information to enable the item to be sent to an address designated by the user.

37. A method as claimed in claim 36, wherein the items to be purchased are sent to a postal address.

38. A discount purchase scheme in which a user is provided with an item using a method as claimed in claim 36, the method further comprising discounting the cost of the item returned by the search by a predetermined amount in accordance with a discount rule determined by the proxy server.

39. A discount scheme as claimed by claim 38, wherein when an item is purchased a user preference is updated to reflect a predetermined number of points which can be indicated by the user in at least one future search request for an item and associated cost information.

40. A discount scheme as claimed by claim 39, wherein the points indicated by the user preference generate a discount in the cost of an item indicated by a search result which at least partially conforms with the future search request.

41. A method enabling a user to search for information on the cost of an item on a distributed computer system, the distributed computer system including an end

terminal of the user, a proxy server, and at least one information source, the method comprising:

generating a search request for the item at the user terminal;

modifying the search request to indicate at least one user preference;

forwarding the search request from the proxy server, the proxy server being adapted to retrieve data from one or more of said data sources, the proxy server being adapted to process a search result received from a data source and provide additional information to further interrogate a data source identified by said search result to receive a second search result, the proxy server being adapted to provide the second search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

42. A method as claimed in any one of claims 1 to 29 or claim 41, wherein the SIP search software optimises the purchase of complex items requested by prompting the user for additional parameters which relate to the purchase.

43. A method as claimed in any one of claims 1 to 29, 41 or 42, wherein a user enters a search request and the SIP server modifies the terms in the search request to optimise the purchase price of an item.

44. A method as claimed in claim 43, wherein the SIP server provides a notification of the results to a user end terminal and the user increases the bandwidth available to receive a search result following said notification.

Abstract

A method of purchasing an item, the method enabling a user to search for information on the cost of an item on a distributed computer system, the method comprising: generating a search request for the item at a user terminal; modifying the search request to indicate at least one user preference; forwarding the search request to a server adapted to retrieve data from the distributed computer system, the server adapted to provide a search result to a user terminal selected in accordance with a predetermined user preference dependent on the extent to which the search result conforms with the search request, whereby the user is able to purchase the item at the cost informed by the search result.

Figure 1.

Phone

14c

12b

Speech<->text

Re-configure
Request using:
Preferences
Past results
User location

SIP User Agent

Search Software
Modules

Advertise
Services

Search Engine
or Database

14b

Search Software
Module 2

12a

SIP Proxy
Server

10b

User

Format request

10a

Search Software
Module

SIP User Agent

HTTP

14a

Web
Server

Figure 1

20 — USER INITIATES SEARCH SESSION AT USER TERMINAL AND GENERATES SEARCH REQUEST

21 — USER TERMINAL SOFTWARE (ETS) MODIFIES SEARCH REQUEST

22 — ETS ENCAPSULATES SEARCH REQUEST IN SIP MESSAGE, AND SENDS TO PROXY SERVER

23 — PROXY SERVER PASSES ENCAPSULATED SEARCH REQUEST MESSSAGE TO PROXY SERVER SEARCH SOFTWARE (SSS)

24 — PROXY SERVER SEARCH SOFTWARE SSS DE-ENCAPSULATES SEARCH REQUEST, PROCESSES REQUEST ACCORDING TO USER PREFERENCES

25 — THE PROXY SERVER FORWARDS PROCESSED REQUEST TO DATA SOURCE IN APPROPRIATE FORMAT

26 — DATA SOURCE PROCESSES SEARCH REQUEST, GENERATES SEARCH RESULT, DATA SOURCE FORWARDS SEARCH RESULT MESSAGE TO PROXY SERVER

27 — PROXY SERVER DE-ENCAPSULATES SEARCH MESSAGE, SSS PROCESSES SEARCH RESULT AND DELIVERS IN ACCORDANCE WITH USER PREFERENCES TO DESIGNATED USER TERMINAL(S)

Figure 2

30 — USER INITIATES SEARCH SESSION AT USER TERMINAL – either using text or speech

31 — ETS parses search request – identifying possible pro-forma (eg travel, financial...)

32 — ETS Requests additional information or queries possible mistakes (eg departure date before arrival date, cost preference...)

33 — ETS checks cache for recent similar searches – if similar search is held in cache on the terminal or the server then only updates need be sent

34 — ETS formats search request – eg Travel requests have pre-set destination, time etc fields..

35 — ETS encrypts request with session key (established when user authenticates at start of association of address and SIP id)

36 — ETS places encrypted payload in SIP message with TYPE set at SEDP (Search Description Protocol)

37 — ETS sends to proxy server
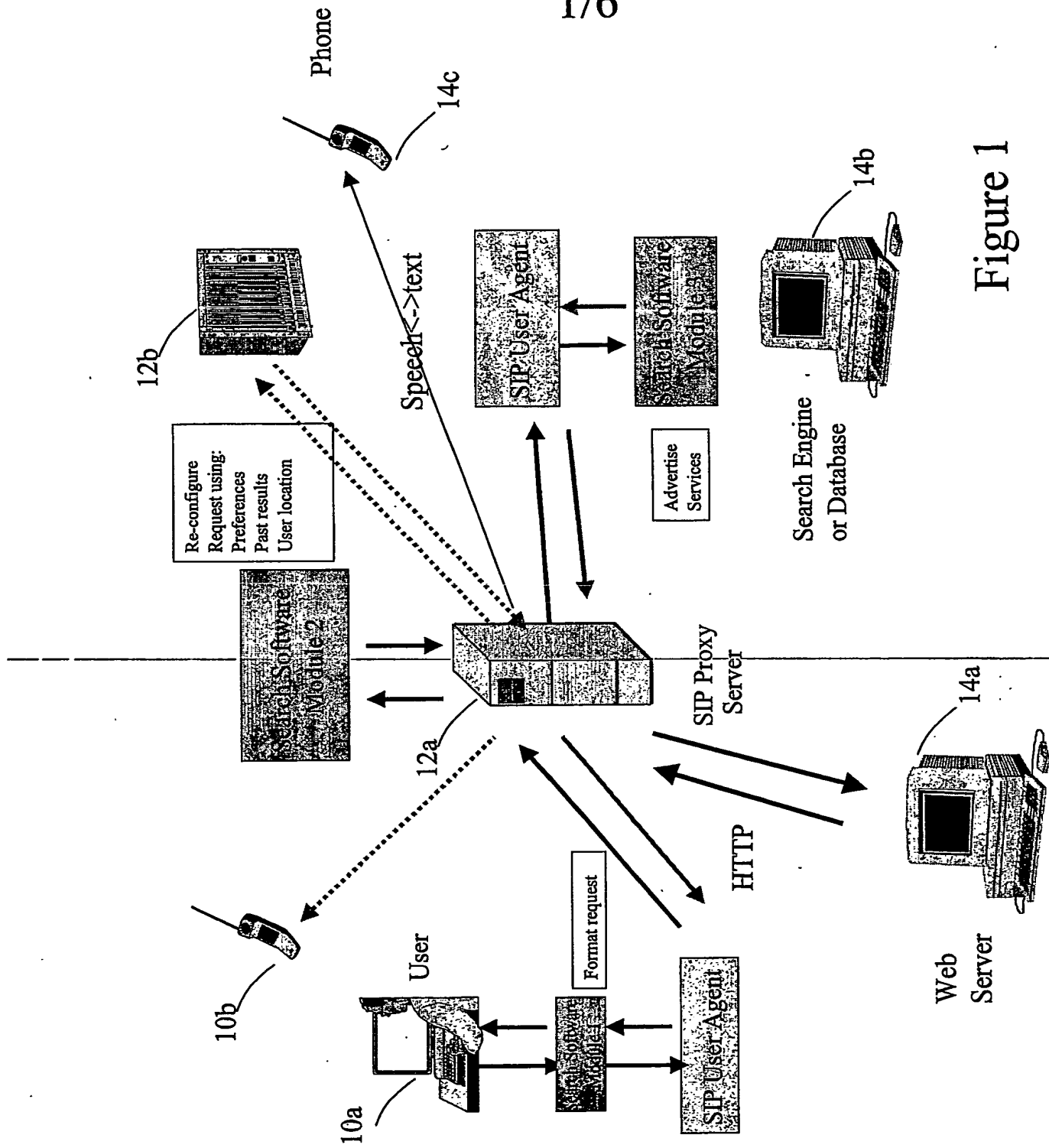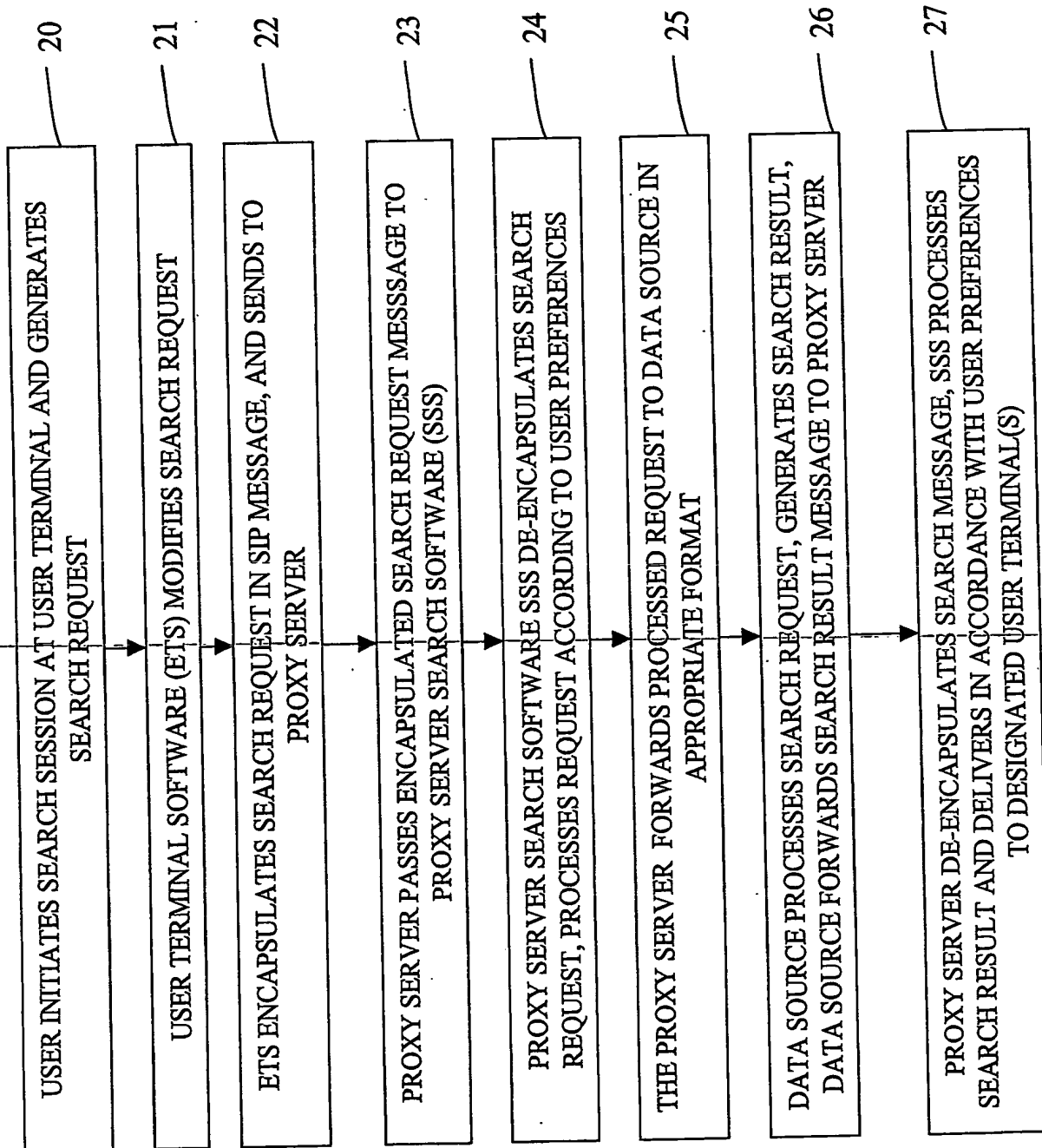
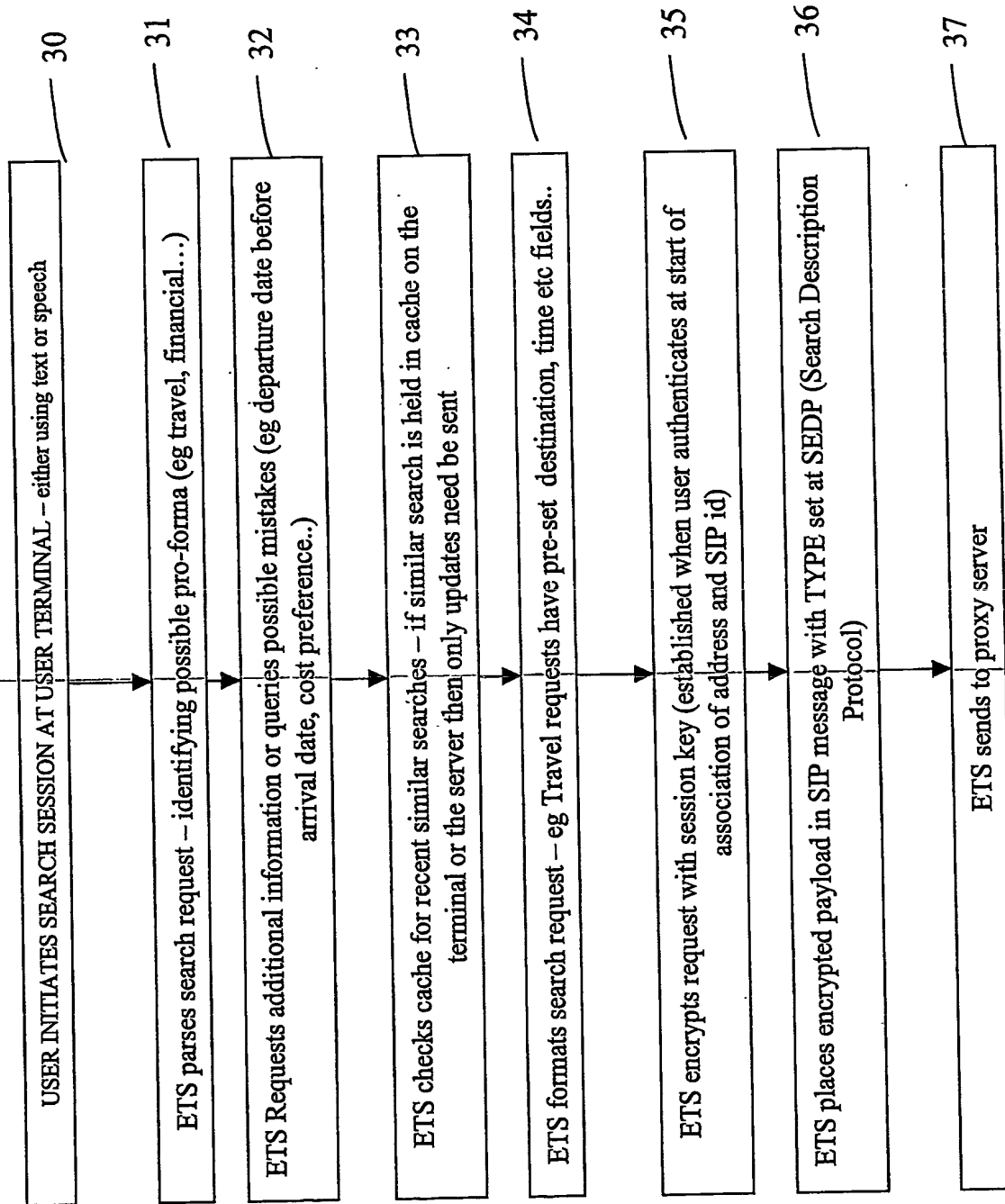Figure 3

```
INVITE sip:search@bt.co.uk SIP/2.0
Via: SIP/2.0/UDP spain.tel:5060
From: joe.bloggs    <sip:joe @atelco.net>
To: Search <sip:  Sea@uk.net>
Call-ID: 1000001@atelco    .net
CSeq: 1 INVITE
Subject: Urgent search
Contact: Joe Bloggs   <sip:joe  @atelco   .net>
Content-Type: application/SEDP
Content-Length: 160
```

```
Type = Travel.air
F=Luton;13,4,04; d=Ulan Botar; 28,4,04;;;
AP=british A; NOT Aeroflot, other
P=price
U=instant; update (phone1);
T=urgent
OS= Hotel, Car Hire, Insurance
    6784^^*jjkkj84
= =
```
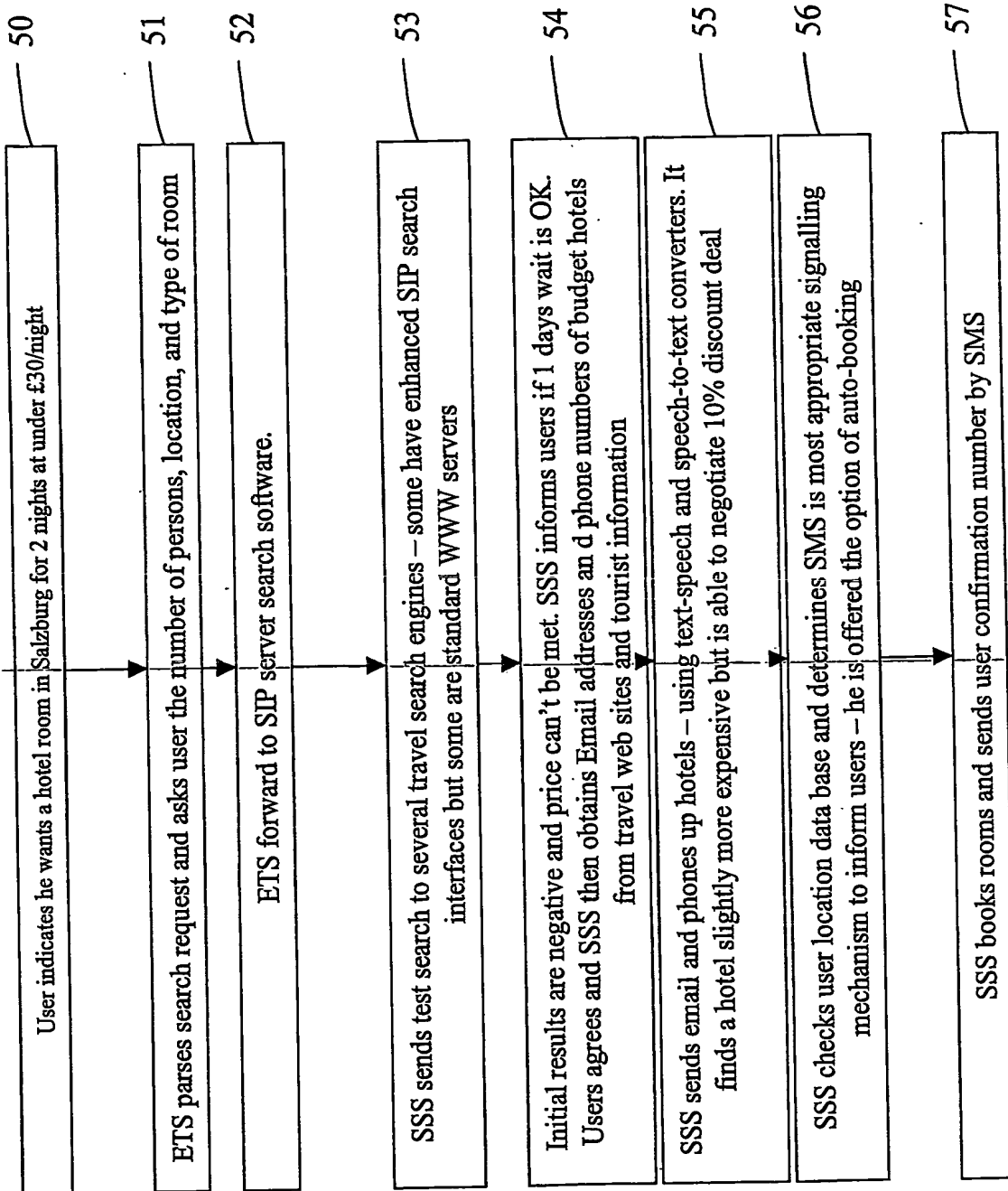
SIP header

SEDP Search description

Figure 4

50 — User indicates he wants a hotel room in Salzburg for 2 nights at under £30/night

51 — ETS parses search request and asks user the number of persons, location, and type of room

52 — ETS forward to SIP server search software.

53 — SSS sends test search to several travel search engines – some have enhanced SIP search interfaces but some are standard WWW servers

54 — Initial results are negative and price can't be met. SSS informs users if 1 days wait is OK. Users agrees and SSS then obtains Email addresses an d phone numbers of budget hotels from travel web sites and tourist information

55 — SSS sends email and phones up hotels – using text-speech and speech-to-text converters. It finds a hotel slightly more expensive but is able to negotiate 10% discount deal

56 — SSS checks user location data base and determines SMS is most appropriate signalling mechanism to inform users – he is offered the option of auto-booking

57 — SSS books rooms and sends user confirmation number by SMS

Figure 5

60 — User makes a request to buy insurance

61 — ETS parses search request and recognises as a standard purchase and generates appropriate form asking the user for more information, ETS corrects any mistakes and adds any relevant information on car and relevant user preference information

62 — ETS encrypts, and sends within a SIP message to the SIP proxy server which passes to the search software.

63 — SSS search software consults a number of information sources using user preferences and locally stored information

64 — Results come back at different times and the user is informed of cheapest by SMS over a predetermined period and sent a key to get the full details

65 — User selects to buy automatically by informing SIP Search Engine to send his credit card and address details to select address indicated by a search result

66 — The insurance company might request more information and the proxy server search software may provide these details automatically.

Figure 6